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BY

E. T. BROWN

AUTHOR OF "YOUR FEW ACRES"; "A YEAR IN MY FLOWER GARDEN"; "THE POULTRY KEEPER'S VADE-MECUM"; ETC.

LONDON
STANLEY PAUL & CO., LTD.

TO

HIS GOOD FRIEND

MRS. HULBERT

THE AUTHOR AFFECTIONATELY

DEDICATES THIS LITTLE BOOK

First published in 1927

Printed in Great Britain
by Burleigh Ltd., at THE BURLEIGH PRESS, *Bristol.*

INTRODUCTION

Everyone is a gardener at heart, though it is not everyone who is able to become an actual grower of flowers, vegetables and fruit. But the ranks of the amateur gardener are being increased daily, as countless new houses are being erected; consequently more and more are able to put into practice the ideas that have long been in their minds. The vast majority of the would-be gardeners, however, possess very little knowledge. All they know is that they want beautiful flowers and choice vegetables and fruit, and that they desire to grow them themselves.

The aim of this volume is to present to the amateur just that knowledge which is essential for him to possess if he is to make a success of his cultural efforts. This aim has been realized in the following pages. Exact knowledge is given in a simple form, without undue use of technical terms, so that the uninitiated may find those details in which he stands in need and apply them under the conditions prevailing at the moment.

All branches of gardening are discussed, so that the personal fancy of each reader is catered for, whether this lies in the direction of tending a flower garden, growing vegetables and fruit, or establishing special gardens wherein various subjects may be cultivated in their natural surroundings. The comprehensive and detailed information will, it is hoped, be found of value to the novice, assisting him on those occasions when his lack of knowledge tends to jeopardize the success of his painstaking thought and labour.

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CHAPTER I

SOILS: THEIR COMPOSITION AND CLASSIFICATION

THE nature of the garden soil can be determined sufficiently correctly by visible signs. A clay or heavy soil clings to the boots and impedes walking; an open soil shifts beneath the feet and does not adhere to the boots. When wet a heavy soil can be moulded in the hand; a loose or open soil will pass readily through the fingers. Rub a soil between the fingers and its texture can be told, since a clay soil has a soapy feeling, whereas a sandy one is gritty.

Soil proper consists of inorganic matter derived from the breaking down of rocks owing to the action of heat and cold, rain and sunshine, and substances mixed with the atmosphere. True soil does not possess any feeding value to the plants that are anchored therein. But all true soil is mixed with a certain proportion of animal and vegetable life. This organic matter is termed humus and it is this which is the main source of plant food.

Soils differ greatly in their composition. All of them, however, contain sand, clay, limestone and humus; it is the difference in the proportion in which these substances are present which regulates the nature of the earth.

A clay soil contains about 50 per cent. of stiff clay; there is a small quantity of sand present, but such a soil is deficient in lime and humus.

A loamy soil is one in which the proportion of clay varies from about 20 per cent. to 40 per cent. ; there is a little humus and lime present, but the remainder is composed of sand. If there be a large admixture of sand the soil is called a sandy loam ; if there happen to be a considerable quantity of lime present it is known as a calcareous loam.

A soil consisting largely of lime with clay, clay loam, sand and humus in only small amounts is termed a calcareous soil.

Sandy soil contains about 80 per cent. of silica—the debris from sandstone and granite—the balance being made up of clay, lime and a very small quantity of humus.

The richest of all garden soil is that which contains from 5 per cent. to 12 per cent of vegetable mould or peat, which is humus in its best form. A peat or bog soil, however, is composed of insoluble fibrous matter from vegetables, together with a little sand and humus.

Good and Poor Soils.

The soil in a locality can generally be determined by the nature of the vegetation growing therein. A poor soil bears numerous Beech and Fir trees ; the hedges and trees are stunted ; there is a plentiful crop of Sedges ; while many injurious weeds, such as Yorkshire Fog, Broom, Heath, Quaking Grass and Moss are prevalent. On the other hand, a good soil is indicated by strong woodlands, but with no Beech or Fir ; strong, healthy hedges ; rich green grass, with plenty of white Clover ; strong weeds ; while the soil is reddish or rich brown in colour and of a good depth.

It is seldom that one comes across a garden containing the ideal soil for flower and vegetable culture. Such a soil should consist of 50 per cent. sand; 25 per cent. clay; 16⅔ per cent. humus; and 8⅓ per cent. lime. Although the perfect garden soil is seldom found it is quite possible to improve the soil already in existence by adding to it those substances in which it is deficient. This question is discussed in Chapter II.

A garden soil can not only be improved by the addition of various ingredients of which it is somewhat short, but its texture can be vastly improved by proper aeration. It is essential that the soil should contain oxygen in the interstices between the minute particles of true soil; otherwise cropping will prove a failure. Aeration can be brought about in two ways. These are by efficient drainage and deep cultivation.

Whether the garden should be drained or not depends upon a number of factors. If the subsoil be gravelly, sandy or stony or if the land has a slight slope there is seldom any need to drain it, since the excess of water will be carried off naturally. A low-lying garden or one composed of stiff clay must, however, be drained; otherwise the soil will always be waterlogged for some hours after a shower.

It is advisable to test the garden to determine whether it should be drained or not. If a number of holes, 3-ft. to 3½-ft. be dug in different parts in winter and they quickly fill up with water it suggests that draining is necessary; if not, this work need not be undertaken. To drain by means of pipes is costly and, therefore, in the small garden some other cheaper method should be adopted. A plan that will answer admirably is to cut parallel trenches 3-ft. deep and 1-ft. wide, these being from 10-ft. to 15-ft. apart, according to the heaviness of the soil. Into the bottom of the trenches 9-in. of broken bricks or any coarse rubble should be thrown - brush-wood or heather may be used, but are not so lasting covered with turves placed grass side downwards to prevent the soil silting

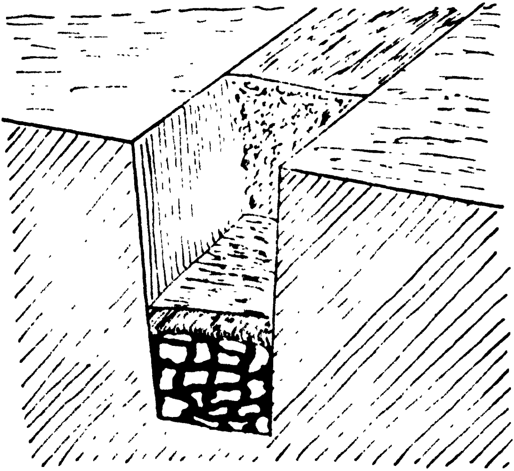

FIG.

through, when the trenches may be filled with soil. (Fig. 1.) The soil should not be beaten down; it should be allowed to settle itself. These trenches must lead to a deep hole dug in the lowest part of the garden, the bottom of this also being packed with stones, rubble, clinkers, etc., so that the water will have an opportunity of draining away.

It is impossible to lay down any hard and fast rules in connexion with draining the garden site by means of pipes, since the exact method adopted must depend upon the nature of the soil, the conformation of the garden, the suitability of various exits and many other factors. It may be mentioned, however, that 3-in. or 4-in. pipes should be used for the main drain; 3-in. pipes should be used for the lateral drains; the pipes should be laid from 2½-ft. to 4½-ft. deep and from 15-ft. to 20-ft. apart; the pipes should not be joined together, but placed end to end and with small pieces of turf over the points where they meet; and the fall of the main drain should not be less than 1 in 200.

The Value of Deep Digging.

Whenever possible deep digging should always be the order of the day, since the more open the lower spits of soil are kept the better will be the crops. It is suggested in a later chapter that the whole garden should be worked over regularly each year, so that each portion is dug to a depth of 3-ft. once, at any rate, every four years. There are three different methods of digging followed, these being single-spit, mock trenching and trenching, while of the latter there are two distinct forms.

When digging the worker should insert the spade as nearly upright as possible, so that a full spadeful is lifted each time, but one should not try to lift more than 5-in. to 6-in. of soil, that is, in width. The work is simplified if the soil from the first trench opened is removed to the other end of the plot, so that there is always an open trench in front of the section to be dug next. This makes it easier to break up the soil as it is turned over, while burying or collecting weeds and distributing manure are rendered more simple. In single-spit digging each spadeful of soil is lifted and as it is thrown into the far side of the open trench it is turned completely over and then broken up by means of the spade.

Mock-trenching is exactly the same as single-spit digging, but the second spit of soil in the open trench is forked over before it is covered with the layer of broken-down top soil. This forking over of the second spit is highly beneficial, since it aerates the soil, with the result that the oxygen in the air is able to act upon the insoluble plant food contained therein, rendering it soluble and, therefore, available. When digging, and this applies to all methods perennial weeds should be collected and burnt, but stems and leaves of annuals can be dug into the ground, since they increase the humus content of the soil.

Trenching consists of working to a depth of 3-ft. The top spit of soil is generally better in quality than the second spit and if this be so the following plan of digging should be adopted: A trench 2½-ft. wide should be opened to a depth of 1-ft. the excavated earth being removed to the other end of the plot (A, Fig. 2); next a 2-ft. wide trench in the second spit of soil should be made, the soil from this also being removed, but kept apart from the top soil (B, Fig. 2). This forms a trench with a 6-in. wide step, as shown in Fig. 2. Digging can then proceed, the first operation being to fork over the third spit of soil at the bottom of the 2-ft. wide trench; the second to lift the 6-in. step of second spit soil, throwing this into the far side of the trench and breaking it up; the third to lift the next 6-in. of top soil, throwing this on top of the second spit of soil at the back of the trench, when the third spit of soil may be

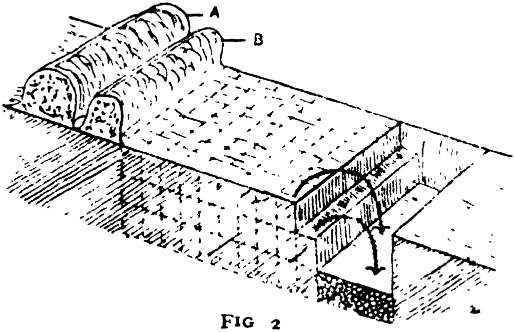

FIG 2

forked over. By continuing in this manner the whole of the plot is worked to a depth of 3-ft.,

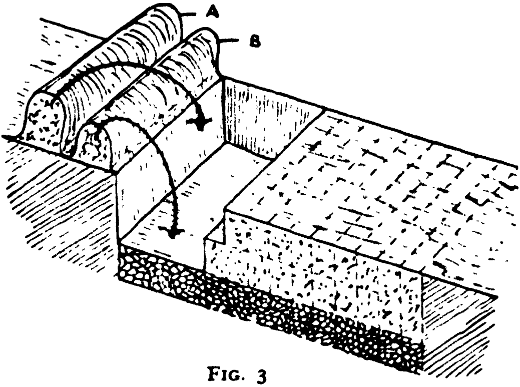

FIG. 3

but the individual layers are left in their original places (Fig. 3).

In some cases the top and second spits are pretty much the same in quality, therefore a different plan may be adopted. In this case a 2-ft. wide trench of top soil should be opened, the soil removed to the other end of the plot (A, Fig. 4), this being followed by the removal of the second spit to the same width (B, Fig. 4).

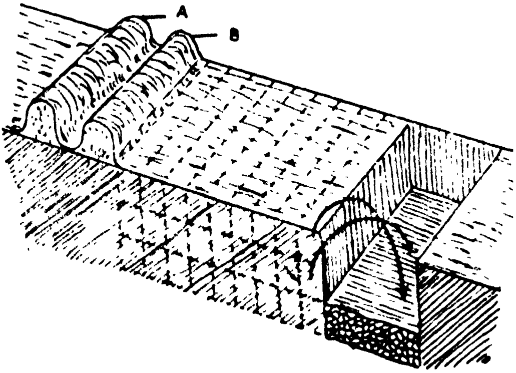

FIG. 4

The third spit is then worked over with the fork. The next operation is to lift the following 6-in. of top soil, throwing this into the far side bottom of the trench, the next 6-in. of the second spit being thrown on top of the top soil. In this way the first and second spits of soil are reversed, while the third spit is worked by means of the fork (Fig. 5). This method of digging should always be adopted in the case of a new garden, when the uncongenial soil from the footings of the dwelling-house has been scattered over the garden site. This system of trenching buries it completely, so that it is out of harm's way, while it will be vastly

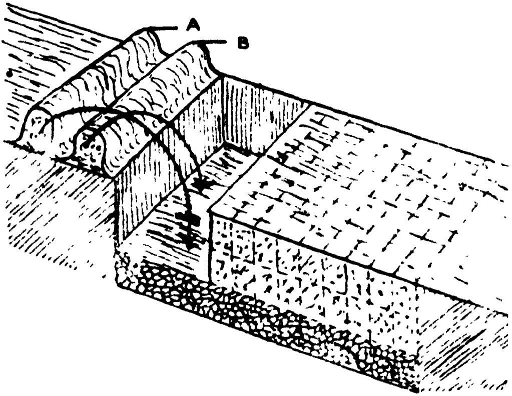

FIG. 5

improved for future years owing to it having been worked thoroughly and, therefore, aerated.

CHAPTER II

SOIL AS A STOREHOUSE FOR PLANT FOOD

PLANTS do not obtain their supply of water from that which is present in the spaces between the particles of soil, but the root hairs collect it from the moisture that clings to the surfaces of the particles themselves. The larger the area on which moisture may be held by adhesion, therefore, the less likely the plants are to suffer from drought. A retentive soil, as it is called, is preferable for cultivation, but only within certain well-defined limits. If the particles be very minute and close together, as in the case of a very heavy clay, capillary attraction is destroyed, therefore the moisture cannot pass readily from one patch of soil to another, as it can and does in a less retentive soil. It is this which causes a clay soil to crack during a spell of hot weather, although another section of the plot, say in the shade, may be almost saturated with moisture. A light soil is not so retentive as a clay, but it suffers less from drought than one would imagine, owing to the fact that the moisture can pass readily through the soil by capillary attraction.

There is no cause to enter into a detailed explanation concerning the manner in which soil is able to store up plant food. It will suffice to state that the soil has the power not only of holding plant food for an appreciable length of time, but also of extracting plant food from both solid and liquid manures. In the case of a solid manure the greater part of the plant food is held by the humus ; that is, the decayed organic matter which constitutes the bulk of the manure. It is customary, however, for the amateur gardener to rely largely upon liquid manures, since natural manure is so difficult to obtain nowadays. One would naturally think that the water in the liquid manure would percolate rapidly through the soil, carrying with it the plant food in solution. This is not, however, the case. The soil has the power of abstracting the dissolved portion of the liquid manure and holding it for the time being. This is, of course, more pronounced in the case of a heavy soil than a light one. There is a vast difference in the length of time the soil will hold various fertilizers. Nitrate of soda, for instance, passes very rapidly through the soil ; sulphate of ammonia and many other chemicals escape much more slowly. This point must be taken into consideration when applying artificial manures, since it would be folly to apply nitrate of soda some weeks before the plants were ready to make use of it, for the reason it would all be wasted.

One very important point that should always be remembered in this connexion is that the soil will take up and retain a greater proportion of the chemicals contained in a weak solution than in a strong. The rule " little and often " is, therefore, the best one to adopt.

Soil Improvement.

The soil furnishes a root-hold by means of which the plants are able to fix themselves ; it also acts as a storehouse from which the plants can absorb the greater part of their nourishment. To be fertile the garden soil must be of such a texture as shall be compatible with the healthy life and development of the roots and shall contain, in an available form, the necessary foods, together with a sufficient supply of water.

If the soil be naturally heavy it may be lightened by the addition of sand, leaf mould, wood ashes and natural manure -horse manure with a considerable admixture of well-rotted straw - and decayed vegetable material. If the soil be very light it may be brought into a better state by the addition of clay, fibrous loam -the top spit of soil from an old meadow is excellent when it can be obtained -leaf mould and cow or pig manure. In these ways the heavy soil is kept more open and the light soil bound, so that the former is rendered less and the latter more retentive.

The Need for Liming.

The three chief forms of plant food are the nitrates, phosphates and potash salts. Even when present these foods are non-available unless there be an adequate amount of lime in the soil. Lime is not a true plant food but with the bacteria content of natural manure, it renders organic matter in the soil accessible to the plants. It makes heavy soil more porous, lessens the risk of insect and fungoid pests and sweetens sour soil.

The garden soil should be examined periodically to determine its lime content. As a general rule, an application of lime should be applied every four years and, since it should never be applied at the same time as natural manure, an opportunity should be taken of liming the vegetable plots when they are dug over in the autumn or winter and not manured.

Testing for lime is a simple task. A little soil should be dried in the oven and placed in a china bowl or saucer. A few drops of strong hydrochloric acid should be poured on to it and the effect noted. If no visible result accrue the soil stands badly in need of lime ; if a slight effervescence be noted it indicates that the time is fast approaching when lime will be required ; but if the effervescence be brisk it may be taken that an abundance of lime is still present.

There is a number of different forms of lime that are employed, but the two best for the amateur gardener are slaked lime and carbonate of lime. Slaked lime should be used for heavy soils, at the rate of 12-lb. per rod, being spread over the soil just before it is dug over in the autumn. It should be applied immediately after slaking. Carbonate of lime should be used exclusively on light and sandy soils, applying it at the rate of 20-lb. per rod three weeks or so before sowing or planting time ; it may even be used when sowing or planting, as this form of lime is not injurious to seedlings.

Green Manuring.

When natural manure is scarce and it is necessary to increase the humus contents of the soil green manuring should be practised. This consists in sowing the seed of some quick-growing subject, such as mustard, rape or vetches, digging them in just before they begin to flower. The best crops for this purpose are found among the leguminæ, since the roots of these plants are supplied with nodules which have the power of collecting free nitrogen from the air. They do not, therefore, deplete the soil of its nitrogen contents, but add to it when they are dug in. The soil is not only enriched owing to an increase in humus, but it also benefits from an extra supply of nitrogenous material and carbonaceous substances, the elements of which have been gathered from the atmosphere. This method of manuring is frequently adopted in the case of a new garden.

CHAPTER III

MANURES AND MANURING—WHY, WHEN AND WHERE

THE three substances that must be added to the soil to render it fertile, whether for flowers, vegetables or fruits, are phosphates, potash and nitrogen. It may be stated generally that all plants deplete the soil of its contents of these chief plant foods; hence the imperative need for replenishing the supply. But it is not sufficient to add these substances; they must be in such a form that they are readily available and so capable of being absorbed by the tiny roots and root hairs.

Different soils naturally require the addition of different quantities of these plant foods. Peas, Beans and other leguminous crops do not require any great quantity of nitrogen, since they gather the greater part of their supplies from the free nitrogen in the air, but they do respond to applications of phosphates; Potatoes and Tomatoes, on the other hand, require potash, while green vegetables stand in need of nitrogenous foods.

It may be taken as a general rule that farm-yard manure, when it can be obtained, improves all soils—horse manure for heavy land and pig and cow manure for light land; that potash should not usually be added to clay soils, but that it should be to sandy soils; that lime should be added to clay soils in order to liberate the potash; sandy and gravelly soils are generally deficient in nitrogen, therefore this must be supplied; and that soils containing a large proportion of humus, such as peat soil, tend to become sour very quickly, therefore more frequent applications of lime may be necessary.

The various manures employed in the ordinary small garden differ considerably in their action. Some are quick-acting ; others are slow-acting and upon the rate at which they act so should they be applied. Nitrate of soda, for example, should only be used when the plants are in a fit state to make use of it at once, but sulphate of ammonia and many other chemicals may be applied some time in advance.

Nitrogenous manures encourage quick growth and the development of leaf and stem ; they also give good colour and add considerably to the bulk of the crop. Phosphatic manures assist in the development of fruit ; hence are invaluable for the production of flowers, seeds, fruits and roots. Potassic manures also help the development of flowers and fruit, but at the same time they increase the size and enhance the flavour of vegetables and generally promote health. Combined manures—those which contain two or more of the three chief plant foods—act in direct ratio to the proportion in which the several ingredients are present.

Organic Manures.

Farmyard manure, whether made from horse, cow or pig dung, is the most valuable fertilizer known. This is not only due to the fact that it contains the three chief forms of plant food, but its value is largely due to the presence therein of enormous numbers of bacteria. These bacteria act upon the insoluble plant food contained in the soil, rendering it fit for assimilation by the plant roots. Its texture and the gases which are given off during fermentation tend to lighten the soil and keep it more open and workable.

The supply of farmyard manure is, however, inadequate in most districts. Some form of organic manure must be employed; therefore, one must fall back upon substitutes for animal droppings. All organic waste may be pressed into service, such as road sweepings, vegetable refuse, leaves, lawn cuttings, fish guano and hop manure. Failing a supply of farmyard manure a considerable quantity of material from the compost heap should be worked into the soil every year at the time of the annual digging. Poultry manure is a natural manure, but it is so concentrated that it is better to look upon it as an artificial, using it as such.

Liquid manure may be made from horse, cow, and pig dung, the practice being to place a bushel in a sack, suspend this in a barrel of water, and leaving it for two or three days. The liquid is then too strong for use; it should be diluted to the colour of weak tea. As the liquid is removed from the barrel a like quantity of water should be added. After a few weeks the sack should be squeezed, as this will strengthen the liquid. Soot water may be prepared in the same manner.

The value of the compost heap has been mentioned. A rule should be made that not a single thing produced by the soil should be thrown away and wasted. Whatever material will burn should be burnt; the resulting ash being highly beneficial. That which will not burn should be piled into a heap under cover and allowed to decay. Such things as lawn trimmings, leaves—excepting Oak and Beech leaves—turf clippings, weeds, old potting soil, soil from the frame beds and greenhouse beds and many other substances should be piled together and mixed from time to time. An occasional watering with liquid manure will increase the value of the heap. All Oak and Beech leaves should be stored separately, since these are required for making hotbeds. They decay slowly; therefore, the temperature of the bed is maintained for a considerable length of time.

Artificial Manures.

The small supply of farmyard manure that is generally available must be augmented by the use of artificials. These provide the necessary plant food in a highly concentrated form. They must be looked upon as fertilizers purely and simply, since they do not in any way affect the structure nor the chemical activity of the soil; they add no humus thereto; do not affect its tilth; nor yet contain any beneficial bacteria.

The three chief nitrogenous manures are nitrate of soda, sulphate of ammonia and nitrate of potash. The first mentioned acts very rapidly and is usually applied as a top-dressing at the rate of 1-lb. per rod; the sulphate of ammonia is slower-acting and should be applied early in spring, generally at the rate of 2-lb. per rod; the third—nitrate of potash—is very expensive and is, therefore, not recommended. All nitrogenous manures act quickly and appreciable growth is often noticeable within a few days of applying them; the plants become greener and altogether more vigorous. These manures must not, however be used to excess, since this promotes rank growth, accompanied by a lack of flowers and fruit, while the plants are more liable to attacks from fungoid pests.

Of the potash manures kainit is, generally speaking, the cheapest and best; it should be dug into the soil in spring at the rate of 2½-lb. per rod. On heavy soils another valuable potash manure is sulphate of potash, this being applied at the rate of 1½-lb. to the rod. Liberal dressings with the refuse from the garden bonfire is a simple and inexpensive method of adding potash.

Three highly efficient and inexpensive phosphatic manures are available. These are superphosphates, the quickest in action; dissolved bones, rather slower in action; and basic slag, the slowest in action, but the cheapest and most enduring. Superphosphates are usually applied just before the plants mature at the rate of 5-lb. per rod; dissolved bones should be applied in spring or early summer at the rate of 4-lb. per rod, while basic slag should be applied in winter at the rate of 15-lb. per rod. Basic slag is particularly useful on medium and heavy soils which are rather deficient in lime, and are wet and stiff, but to obtain the full advantage from this manure the ground must already contain a considerable quantity of organic material.

Quantities of Manure to apply.

When sufficient farmyard manure can be secured it is quite unnecessary for the amateur gardener to invest in chemical fertilizers, save to buy a very little now and again for some special purpose, say, to produce particularly choice blooms, vegetables or fruit or to assist special plants during a spell of bad weather. But there are very few who are in a position to procure all the natural manure they need. Some can generally be purchased; hence artificial manures must be employed in addition.

In the following table the chief manures are dealt with and certain quantities are suggested in each case. For instance, it is stated that three large barrowloads of farmyard manure should be applied per rod as a full dressing in autumn, winter or spring. If only one half of the quantity can be secured a half dressing of basic slag (7½-lb.) and a half dressing of kainit (1¼-lb.) should be applied to light soil to make up the total required, while a half dressing of sulphate of ammonia (1-lb.) should be applied in spring or during the active growing period of the subjects in question. In this way the full amount of plant food is supplied to the soil. On heavy land a half dressing of natural manure—cow or pig, for preference—should be given, together with a half dressing of basic slag to increase the phosphates and a half dressing of sulphate of potash to increase the potash, while sulphate of ammonia—one-half the quantity given in the table—should be applied during the active growing period. From what has been said no one should have any difficulty in manuring their garden in an efficient manner with whatever manures be readily obtainable in the district.

Full particulars are given in later chapters concerning the requirements of different flowering plants, vegetables and fruit trees and bushes in the way of manure. In the following table, however, brief reference is made to the crops for which each manure is most valuable. Particulars are also given regarding the best soil, the time of year the manure should be applied and the quantity which makes a full dressing. It should be remembered that 1-lb. per rod equals 1⅜-cwt. per acre and ½-oz. per square yard.

ARTIFICIAL AND NATURAL MANURES.

Manure.	*Soil.*	*Time to apply.*	*Rate per square rod*	*Crops.*
Ammonia, Nitrate	Any	Growing Period	2-lb.	Fruit and vegetables
Ammonia, Sulphate	Clay and Chalk	Spring, early summer	2-lb.	Green vegetables.
Basic Slag ..	Light or Heavy	Spring (light) Autumn (heavy)	15-lb.	Never on soil deficient in lime. Most suitable for slow-growing plants.
Blood, Dried .	Any	Growing Period	6-lb.	Flowers and vegetables.
Bone-meal ..	Light	Autumn	5-lb.	Herbaceous plants, fruit, lawns, shrubs
Bones, dissolved ..	Chalk	Spring, summer	4-lb.	All plants.
Farmyard manure..	Cow (Light Horse (Heavy)	Winter or Spring light), Autumn (heavy)	3 large barrowloads	All plants.
Fish Meal	Light, Medium	Autumn, Winter	3-lb.	Potatoes, turnips and all plants.
Guano	Any	Growing Period	2-lb.	All plants.
Hop Manure .	Clay, sandy	Autumn	35-lb.	Herbaceous plants, fruit, shrubs.
Kainit	Light, heavy	Spring (light) Autumn (heavy)	2½-lb	Vegetables, fruit
Leaf mould.. ..	Clay	Winter, early Spring	3 large barrowloads	All plants.

ARTIFICIAL AND NATURAL MANURES.

Manure.	*Soil.*	*Time to apply.*	*Rate per square rod.*	*Crops.*
Lime, Sulphate .	Medium, Clay	Spring, early Summer	12-lb	Vegetables, fruit.
Potash, Muriate ..	Light, medium	Spring, early Summer	3 lb	Vegetables, fruit.
Potash, Nitrate ..	Any	Spring	2-lb	All plants.
Potash, Phosphate	Light	Spring, early Summer	2½-lb	Flowers, vegetables.
Potash, Sulphate ..	Light, heavy	Spring, early Summer	1½-lb	Flowers, Asparagus, Carrots, Cauliflowers Onions, Potatoes.
Poultry manure ..	Any	Growing Period	10-lb	All plants, especially roots
Soda, Nitrate	Light, dry	Spring, early Summer	1 lb	For leaf growth.
Soot	Light, sandy	Summer	1 peck	All young plants.
Superphosphates	Light, medium	Spring (light) Autumn (medium)	5 lb	Most plants.
Vegetable refuse ..	Light, medium	Winter	4 large barrowloads	All plants
Wood ashes ..	Heavy	Autumn, Spring, Summer	10-lb	Beans, Carrots, Onions, Peas, Potatoes, fruit.

CHAPTER IV

THE GARDEN LAY-OUT

WHAT should be attempted and what should not be attempted in the amateur's garden must depend entirely upon its size. In the case of a very small garden it is generally better to devote the greater part of the area and the major portion of one's time to the cultivation of flowers, for the reason that vegetables can often be bought for less than it costs the amateur to grow them. The vegetable garden is never such an attractive feature as the flower garden; hence more time and space should be devoted to the latter.

The lay-out of the garden is a very important matter and one that should be carefully considered in advance. The whole should be compact, but not cramped in appearance; the unity between its successive features must be preserved. The outlying parts should be less formal than those close to the house, while all sections should be separated in some distinctive manner, so that the whole area is not seen at a glance. In this way the smallness of the garden is much less noticeable. Bare stretches of wide gravel paths tend to give the garden a cramped appearance; a good breadth of lawn, on the other hand, makes for a greater sense of space.

Paths are necessary, but these should be as few in number as possible, compatible with ease of working the beds and plots. Side paths should not be less than 2-ft. in width; main paths should be 4-ft. wide, so that two people can walk abreast. The paths should be marked out first and the surface soil removed to a depth of 9-in. to 18-in.—the wider the path the deeper the excavation, while the path should be dug more deeply in heavy soil than in light. From one-third to one-half of the depth should be filled with clinkers, rough stones and the like; next should come a thick layer of gravel and earth mixed, with the top 3-in. consisting of good path gravel. All paths should be made with a camber, so that the rain will naturally drain into the gutters. On very heavy clay it may be necessary to lay down a line of pipes so that the water may be carried away more rapidly.

The Boundary Walls and Fences.

A solid wall on the north and east is desirable, but on the west and south hedges will answer the purpose. A brick or stone wall is the best; failing this one made of split oak, fir, larch, pine or deal should be employed The first mentioned—oak is the dearest, but it is much more durable.

Open fences or hedges may be used on the west and south sides, while any division between the garden sections may also be in the form of hedges. Either evergreen or deciduous (leaf-losing) hedge subjects may be planted. Evergreens should be planted in late September or in April; deciduous plants in October or November. A boundary hedge should be planted on a ridge; divisional hedges need not be raised above the ground level.

The best evergreen hedge subjects are: Berberis Darwinii, Box, Cupressus macrocarpa, C. Lawsoniana, Evergreen Oak, Holly, Laurel, Thuya Lobbii and Yew. The best deciduous hedge subjects are: Beech, Hornbeam, Privet, Thorn (Quick) and Myrobella Plum.

The Lawn.

• A northern aspect is generally to be preferred to a southern one for the lawn. The soil must be good and well drained. On heavy land the site should be drained by means of pipes, with a 4-in. layer of ashes above covered with about 9-in. of soil. The whole area should be dug to a depth of 18-in. grass is not a deep rooting subject the best soil being retained on top. If the site be drained by means of pipes rather poorer soil should be used above the pipes; otherwise these parts will always be greener, owing to the extra moisture provided. After digging the ground should be levelled, a spirit level being used for the purpose.

A new lawn may either be seeded or turves laid down. When made from seed 1-oz. to 2-oz. of seed is required per square yard and it pays to buy special seed from a first-rate firm, since the absence of weed seeds is a very important point. The seed must be suitable to the soil, situation and for the use to which the lawn is to be put. The best plan is to ask advice from a reliable seedsman, telling him the conditions under which the grass will have to grow. For general guidance it may be stated that for ordinary garden use the following should be used: Festuca ovina tenuifolia, Cynosurus cristatus, Poa nemoralis sempervirens, Poa pratensis and Poa trivialis. For light soil: Cynosurus cristatus, Festuca duriuscula, Festuca rubra, Festuca ovina tenuifolia and Poa pratensis. Poor soils: Festuca duriuscula. In shade: Poa trivialis. Dry soils: Festuca rubra.

For town gardens: Poa annua and Poa nemoralis. Seaside gardens: Festuca rubra.

The seed may be sown in spring, when it takes three weeks to germinate, or in August or the beginning of September the better time - when germination takes about ten days. A dry, windless day should be selected; the seed should be mixed with an even quantity of fine soil; a square yard should be sown at a time, the sowing being done in two operations; the site should be lightly raked after sowing to cover the seed; black threads should be stretched across as a protection against birds. When the grass is an inch high the plot should be rolled with a light wooden roller; when 2-in to 3-in. high any weeds should be removed carefully and regular cutting with a scythe should begin. The scythe only should be used for several months; a mower tends to pull up the young plants. When scything begins a top dressing of 1-oz. of guano per square yard will prove helpful. When the mower is first used it should be set to cut one inch instead of the usual ½-in. with an established lawn.

Making a lawn from turves is an expensive business, but the desired result is more quickly achieved. Turves may be bought in all parts of the country, but care should be taken to see that they are free from weeds—Cumberland turves are generally reckoned the best, but these are costly. When putting down the turves they should be fitted close together and laid diagonally across the lawn and should be "bonded," that is, the junction between two in a row must come opposite the middle of the turves in the rows on either side. Roll after laying and give a ½-in. dressing of fine, sharp sand, brushing this in. Cut twice a week with a scythe for the first three weeks ; afterwards once a week with the mower rolling after each cutting. The best time to make a lawn from turves is the spring, but the work should be completed by the end of March.

Lawns should be cut and rolled two or three times a week during the growing season of the year and rolled once a week during the winter, if the ground be not too wet. The grass must be fed, the following fertilizers being recommended :

For young grass : 1-oz. guano per square yard in May for any soil.

For poor, weak grass : 1-oz. sulphate of potash or kainit in March for light land, or 2-oz. bone-meal or equal parts of bone-meal and superphosphates in October or February for heavy land.

For scorched grass : ½-in. thick dressing of equal parts fibrous loam and leaf mould with a sprinkling of guano or soot in February for light land, or ½-oz. nitrate of soda in March for heavy land.

For rank, coarse grass : ½-in. thick dressing of clean, sharp sand early in February on heavy land.

For mossy lawns, blacken the grass with soot before rain in October and November.

Arches, Pergolas and Trelliage.

Wherever a legitimate place can be found for an arch or a pergola—a string of connected arches—these should be employed. They tend to break up the conformity of the garden. Trelliage is particularly useful for covering a bare wall or for screening off some unsightly part of the garden ; it may also be used in place of divisional hedges. Wooden arches are preferable to metal ones, but the latter may be employed.

Roses are eminently suitable for arches and pergolas. The best are found among the ramblers and the Wichuraiana, the following being exceptionally fine: Alberic Barbier, creamy-white; American Pillar, pink with white centre; Aviator Bleriot, saffron and yellow; Crimson Rambler, crimson; Delight, carmine; Dorothy Perkins, shell-pink; Hiawatha, crimson; Jersey Beauty, pale yellow; and Silver Moon, white.

There are, however, many other climbers that may be used for arches, pergolas, and trelliage. Among the best are:

AKEBIA.—Sandy peat, loam and leaf mould; purple-claret flowers in racemes in spring.

ARISTOLOCHIA SIPHO (Dutchman's Pipe).—Light soil; yellow and brown flowers in summer.

CEANOTHUS (Mountain Sweet).—Well-drained loamy soil; evergreen; blue flowers from May onwards.

CELASTRUS SCANDENS (Staff Vine).—A cool soil; golden yellow fruits in autumn and orange seeds when fruits open in winter.

CLEMATIS.—A very large class; C. montana and C. Jackmanii in various colours are the best.

JASMINE.—Any soil; white and yellow flowers in May.

LONICERA (Honeysuckle).—A sandy loam; pink and yellow flowers in spring.

WISTARIA.—A sandy loam; W. sinesis is the best with its mauve flowers, but there is also a white variety.

The Nursery and Reserve Garden.

A good spot should be selected for both the nursery and reserve gardens; a south border in a sunny position and well protected on the north and east is the best site, since only in such a bed can early plants be raised. Containing only seedlings the nursery garden is seldom a thing of beauty; therefore it is advisable to establish this in the vegetable garden, so that it does not interfere with the formal flower beds, nor yet the herbaceous borders. The size necessary must depend, of course, upon the extent of the garden ; whether all seedlings are to be raised at home or purchased ; and whether a greenhouse and numerous frames are available. The size can be regulated from year to year when it is situated in the vegetable garden, according to the needs of the moment. The reserve garden, too, may well be placed in the vegetable section, since at best only small plants will be kept therein, none of which will blossom.

The Herb and Scented Garden.

A section of the vegetable garden should be devoted to the cultivation of herbs ; if space permit a special feature may be made of a combined herb and scented garden. A selection of the following herbs should be found in every amateur's garden : Angelica (s), Balm (p), Basil, Sweet and Bush (s), Borage (s), Chamomile (p), Chervil (s), Chives (p), Dill (s), Fennel (p), Horehound (p), Hyssop (p), Lavender (p), Marigold, Pot (s), Marjoram, Pot (p), Marjoram, Sweet (s), Mint (p), Pennyroyal (p), Rampion (s), Rosemary (p), Rue (p), Sage (p), Savory, Winter (p), Southernwood (p), Tarragon (p), Thyme, Common and Lemon (p), and Wormwood (p). Increased by seeds sown in spring (marked " s ") or bought as rooted plants in April (marked " p ").

To transform the herb garden into a scented garden some of the following should be introduced : Bergamot, Sweet Pea, Clove Carnation, Night-Scented Stock, Wallflower, Sweet Rocket, Sweet Scabious, Daphne, Lily-of-the-Valley, Heliotrope, Jasmine, Mignonette, Sweet Sultan, Mock Orange and Winter Heliotrope.

The Rock Garden.

The establishment of a rock garden is a fascinating branch of gardening, but only those who possess a large garden are likely to be able to undertake the task. It is generally a mistake to attempt to create a special home for Alpine plants within the confines of a small suburban garden. If to be done, however, the following points should be remembered:

A sunny position is necessary, as Alpines are sun-lovers.

The site must be made variable in contour, with numerous mounds and dells.

All arrangement must be irregular; bays should succeed promontories, the paths should be curving and rise from one level to another.

The body of the garden should consist of good fibrous loam; the rocks and stones should be set pointing inwards and slightly downwards (Fig. 6), so that the rain runs into and not away from the soil.

A collection of Alpine plants should be purchased, the choice of subjects being decided by the depth of one's pocket, and others bought as opportunity permits. After planting the young plants the soil should be covered with a ring of chippings to conserve the moisture. Until a good collection of Alpines can be got together numerous other subjects may be grown in the pockets between the rocks. The small-growing varieties of Arabis, Aubrietia, Cerastium, Iberis and Saxifrage are particularly useful for this purpose. The following may all, however, be employed successfully:

Achillea umbellata: 4-in. high; white silvery leaves; flowers from June to September.

Adonis vernalis: 12-in. high; golden flowers in March and April.

Alyssum saxatile compactum: 9-in. high; rose flowers from June to August.

Anemone Hepatica: 6-in. high; blue flowers in February and March.

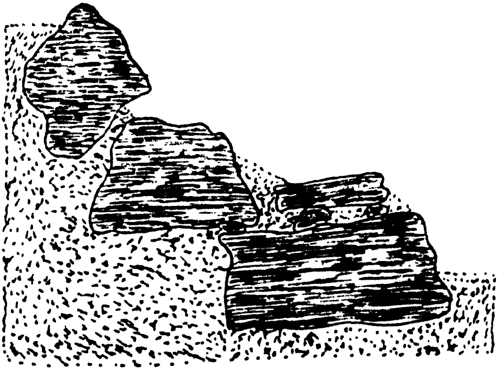

Fig. 6

Campanula carpatica: 12-in. high; pale blue flowers from May to October.

Daphne rupestris: 6-in. high; rose, waxy flowers in May and June.

Dianthus neglectus: 3-in. high; pink flowers from June to September.

Helianthemums (Sun Rose): 6-in. to 24-in.: various flowers from May to October.

Myosotis azorica: 6-in.; blue flowers from May to August.

Nepeta Mussini: 12-in.; lavender flowers May to September.

PHLOX REPTANS: 6-in.; deep rose flowers April to July.

THALICTRUM ANEMONOIDES: 6-in.; yellow flowers from April to June.

In the spring the garden should be gone over carefully. The dead stems from the larger growing plants should be cleared away to a great extent, but a few should be allowed to remain to afford protection. A good top dressing of loam and leaf mould, with a sprinkling of sand, should be applied, this being of sufficient depth to cover the stems of all choice plants. A small square of glass should be placed over the more delicate Alpines in winter, as this throws off the water.

Alpine plants may be raised from seed in June in a slightly heated frame for the more delicate subjects and a cold frame for the remainder. The vast majority of them can be planted out into their permanent quarters in the autumn.

CHAPTER V

THE GREENHOUSE, FRAMES AND PITS

GARDEN frames, both heated and unheated, are a necessity; a frost-proof greenhouse is a great asset. It is generally advisable for the amateur gardener to purchase his garden frames, unless he be clever with carpenter's tools, while in all cases the glazed lights should be bought, since these require very careful making. The standard size for a garden light is 4-ft. by 6-ft.; the frames, either lean-to or gable, should be made of a size to accommodate the number of lights to be used. Sound material, not less than 1¼-in. thick and first-class workmanship are two important factors.

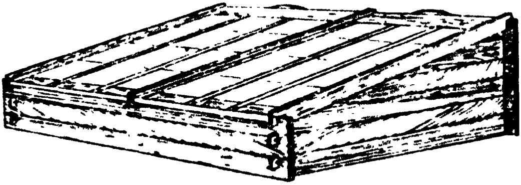

FIG. 7

The frames should be 18-in. high at the back and 14-in. high in front. The cross-members from front to back which are fitted where the lights touch each other should be channelled, so that rain will run down and away from the interior. The construction of a two-light frame of practical design is shown in Fig. 7. The idea of making them in the manner shown is to facilitate moving. Wooden ventilator blocks, made with 2-in. steps, should be used, one being available for each side of each light. A gable frame is made in the same way, excepting that no back is required; the apex should be 18-in. high and the two sides 14-in. high.

Garden frames are sometimes constructed in front of and as part of the greenhouse, being heated by means of hot water pipes connected with the heating apparatus. This is not, however, a very satisfactory plan for the small gardener to adopt. Movable frames are preferable, since during the summer with some subjects it is advisable to turn them round, so that they face towards the north; this cannot be managed with fixed structures.

Cold and heated frames should be made in exactly the same way. The difference between the two is that the former is stood directly upon the ground and then filled in with 6-in. to 10-in. of suitable soil when the plants are to be grown direct in this medium; with cinders or coco-nut fibre when boxes or pot plants are to be housed therein. A heated frame must be stood upon a hotbed.

If the ground be well drained the hotbed may be sunk into the ground; failing this it should be placed on top of the selected site. The best material for making a hotbed is fresh stable manure, but since supplies are generally inadequate it is necessary to mix what manure can be secured with leaves--Oak and Beech leaves for preference, since these take a long time to decay; hence the heat of the bed is more constant and more lasting.

The manure, leaves and any grass or garden refuse that is available should be thrown into a loose heap and as the heat increases it should be turned inside out every day. Lumps should be broken down, the various ingredients thoroughly mixed and the whole kept moist, watering being carried out if necessary. The mixture should be ready in about a week.

The hotbed should be 4-ft. thick and each layer as added should be trodden down firmly, while the heap should be 18-in. longer and wider than the frames, when the frames may be placed in position. The temperature of the bed should be tested daily, either by means of a thermometer or by plunging in a stick, leaving for half an hour and testing by means of the hand, and the bed will be ready for use as soon as the maximum temperature has been reached. At this stage a 4-in. to 8-in. layer of soil should be spread over the bed. Planting may then be started.

A rather cheaper way of securing the same result may be adopted, namely, by making a sunken pit. A high piece of well-drained land should be selected and a hole dug to a depth of 2½-ft., and 2-in. shorter and narrower than the area of the lights to be used. The pit should be lined with 1¼-in. thick boards—rough board may be used—these projecting above the surface of the ground 4-in. in front and 8-in. at the back, so as to give the necessary slope to the lights. Only 20-in. of the manure and leaf mixture need be used in this case, this being trodden well down into the bottom of the pit. When the maximum heat has been reached the hotbed should be covered with a 4-in. layer of garden soil if seeds are to be sown direct therein, or with 3-in. of soil and 5-in. of ashes, if pot plants and seed boxes are to be accommodated.

Greenhouses.

Well-constructed greenhouses are remarkably cheap at the present time; it is not advisable, therefore, for the amateur to go to all the trouble of erecting his own. Greenhouse construction calls for very clever work, as all glazing bars must be fitted into the horizontals by means of stub tenons and every joint must be perfectly made. A skilled amateur can, however, make a creditable job; hence details are appended regarding the various kinds of wood employed.

The best form of small greenhouse is the ordinary gable type, being 6-ft. to the eaves and 8-ft. to the apex. If a large wall with a southern aspect be available a cheaper form is the lean-to, since this may be made 10-ft. high at the back sloping to 5-ft. or 6-ft. at the front, while with a lower wall a broken-span roofed house may be constructed. In this case the house should be about 7-ft. high at the back, rise to 9-ft. or 10-ft. in one-quarter of its width, and then slope downwards to 5-ft. through the remainder of its width. In both cases the back wall is saved.

The lower half of the walls of the gable greenhouse should be made solid, as shown in Fig. 8, 1-in. thick matching or bricks being employed for the purpose. The latter is the better, but is more costly. For the superstructure special materials are required, these being shown in Fig. 9. Throated cill timber (A) is essential below the glazed portion, so that the water will fall off and not percolate into the house; 3-in. by 3-in. battens (B) should be used for the horizontals, posts and rafters: 3-in. by 2-in. (C) for door posts and lintels,

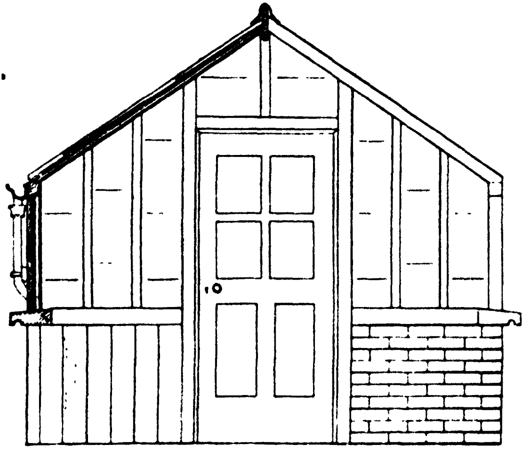

FIG. 8

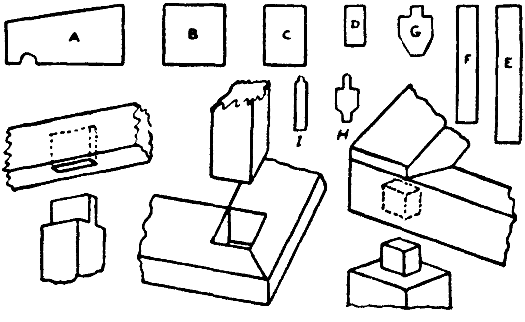

FIG. 9

2-in. by 1-in. (D) for door stops, 7-in. by 1¼-in. (E) for the ridge board, 6-in. by 1-in. (F) for the eaves, 2½-in. deep glazing bars (G), 1¾-in. sash bars (H), and 2-in. sash framing (I) for the glazed portions. The best methods of fixing the cill timber and making the joints for the different parts of the house are also shown in Fig. 9.

The best glass to purchase is that known as 21-oz. Putty may or may not be used, since each pane should be secured by means of fine brads.

Windows should be inserted on each side, these being hinged at the top and made to open outwards; a ridge ventilator, running the entire length of the house should be made on each side; 4-in. stamped steel guttering should be employed, with vertical pipes to carry the water to a barrel or an inside water tank; the whole woodwork should be given two coats of a good priming before glazing, followed by two coats of white paint. These are best bought ready mixed, but can be prepared by stirring together 9-lb. of white lead, 1-lb. red lead, 1 pint each of raw and boiled linseed oil, ½-pint turpentine and 1-oz. of driers for the priming, while the white paint can be made in the same manner, but by missing out the red lead and substituting an additional pound of white lead.

Greenhouse Fittings.

The path down the centre of the greenhouse should be made of concrete, since it is more easily kept clean, while it may be watered in hot weather to moisten the atmosphere. Staging may be placed on both or one side of the path; if only one staging be used a bed should be formed on the other side, this being a better plan with a lean-to or broken span-roofed house.

Ordinary wooden stages may be employed (Fig. 10), made of 3-in. by 1-in. battens on a

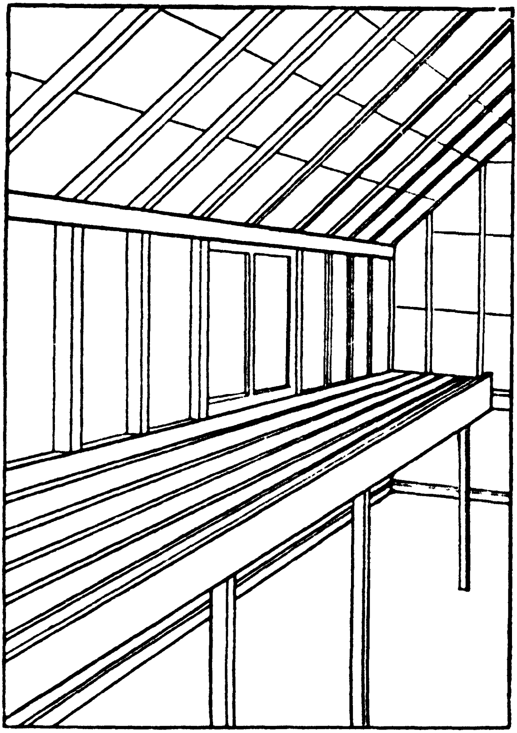

FIG. 10

stout framework, but it is generally better to go to the extra expense of erecting a slate staging (Fig. 11). If this be done a bed of soil may be made up thereon—a plan that frequently saves a vast amount of work.

Strands of wire should be stretched from end to end of the house, these being 1-ft. apart and

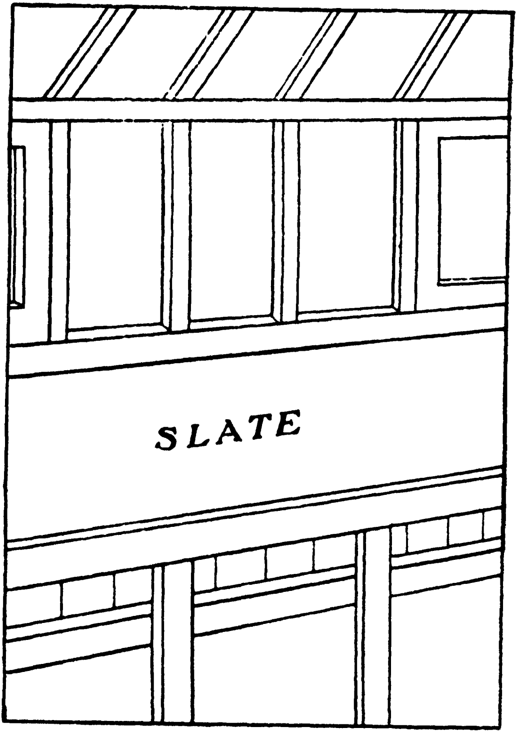

FIG. 11

9-in. from the glass. These are essential when climbers are grown. The back wall of the lean-to or broken-span roofed house may be covered with trellis.

A cement tank or a barrel should be sunk into the ground at one corner of the house and all rain water from the roof should drain into it. It is essential to water greenhouse subjects with water of the same temperature, or perhaps five degrees warmer than the air. This plan, therefore, guarantees a constant supply of warm water.

For shading the inmates during very bright weather a blind should be fitted to the side of the roof sloping towards the south. This is best made so that it can be folded up into a box placed at the apex of the house.

Heating the House.

As is pointed out in Chapter X, very little can be accomplished in the way of securing winter flowers when only a cold greenhouse is available. It is always worth while making the house frost-proof—a minimum winter night temperature of 45 degrees—and much more may be done when the house is properly heated with a minimum winter night temperature of 55 degrees or rather higher. To render a house frost-proof an oil, gas or electric stove mav be used, the last mentioned being the best, since it is less costly to carry a lead from the house supply than to lay down gas pipes, while oil is not altogether satisfactory owing to its smell.

If the house is to be heated in a proper manner a suitable boiler, with the necessary number of pipes should be bought. These are not expensive and any manufacturer will advise regarding size and length of pipes when he is told the size of the house and the minimum temperature required. It is, in fact, better for the amateur to get into touch with a reputable firm than for a large mass of details to be given here. Incidentally it may be mentioned, that to maintain a winter night temperature of 50 degrees approximately 36-ft. of 4-in. pipes—a smaller size should never be used—per 1,000 cubic feet of air space are required, while to maintain a heat of 60 degrees an additional 12-ft. of pipes should be used.

Necessary Minor Fittings.

A mixed collection of flower pots should be purchased, comprising all sizes from thimbles and thumbs to one's and two's. The diameter at the top of the various sizes is as follows: Thimbles, 2-in.; thumbs, 2½-in.; sixties, 3-in.; forty-eights, 4½-in.; thirty-twos, 6-in.; twenty-fours, 8½-in.; sixteens, 9½-in.; twelves, 11½-in.; eights, 12-in.; sixes, 13-in.; fours, 15-in.; twos, 18-in.; and ones, 20-in. New pots should be soaked for some hours in water before using; old pots should always be cleaned thoroughly before using again, a mild disinfectant being employed for the purpose.

Seed boxes are essential, the best sizes being 15-in. by 10-in., with some 3-in., others 4-in. and a few 5-in. in depth. Holes should be bored in the bottom of the boxes to facilitate drainage. Seed pans may also be bought, if these be preferred to seed boxes.

Trays for storing potatoes and bulbs should be made or bought, a good form being shown in Fig. 12. Such trays can be piled one on top of the others; hence space is saved, while the contents is ensured of an adequate supply of air.

Many greenhouse subjects require a greater heat for germination than that provided by the house itself. To secure the additional warmth propagating cases are useful. These are in reality small frames, fitted with a movable

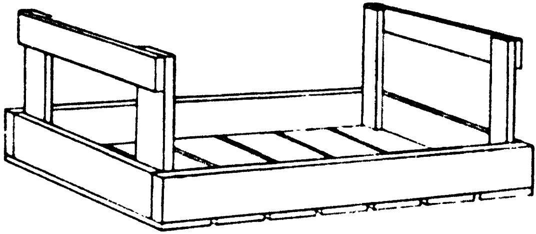

FIG. 12

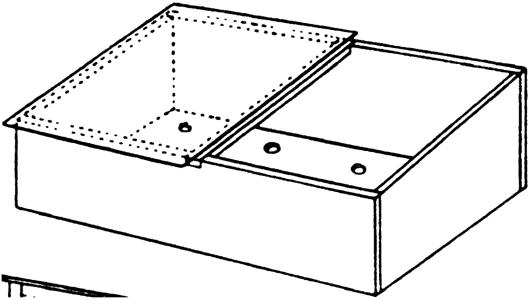

FIG. 13

glass top. They should be made 18-in. from front to back, 13-in. high at the back and 10-in. high in front. They are generally placed on or close to the hot water pipes. A suitable type of propagating case is shown in Fig. 13, the upper drawing being the case, the latter indicating how the pots should be plunged into a bed of fibre.

Garden Tools.

A large collection of tools may be bought and a good use can be found for them all, but it is advisable for the amateur to purchase them as the need arises. For instance, a bulb planter is valuable when bulbs are to be naturalized, or a daisy puller may be thought necessary for ridding the lawns of these and similar weeds. These are, however, more in the nature of special implements and need not be considered here. The majority of the following should, however, be procured fairly early on in one's gardening career: A good sharp spade of correct weight; two forks, one four-pronged with round tines for digging, and one with flat prongs for lifting manure; a good quality trowel; one 8-in. iron rake; a wooden rake; a Dutch and a V-shaped hoe; a wooden trug basket; a water-can with a choice of roses; a garden line with metal holders; a measuring rod 9-ft. long and marked off into feet, with the first three feet marked off into inches; a pruning knife; wheelbarrow; roller; syringe and lawn mower. Later on it may be necessary to add secateurs, a billhook, hedge shears, edging shears, hone for sharpening, a scythe, shovel and garden hose.

THE FLOWER GARDEN

CHAPTER VI

FLOWERING PLANTS AND THEIR CLASSIFICATION

GARDEN flowering plants are grouped into various divisions according to their characteristics and habits. The annuals comprise those subjects the seed of which is sown in the spring, the flowers are produced the same year, when the plant dies. The biennials are those which flower and die the year after the seed has been sown. The perennials are those which continue to flower season after season. In addition to these three main divisions it is customary to consider a number of other subjects apart, the usual term for these being the summer bedding plants. These subjects are rather delicate and cannot, therefore, be utilized for the herbaceous border in the same convenient manner in which annuals, biennials and perennials can be employed. For the convenience of the reader, therefore, they are grouped separately.

The annuals are sub-divided into two groups, these being the half-hardy and the hardy. The plants belonging to these two classes require quite different treatment. It is advisable to deal with them separately, so that the exact method of cultivation may be understood. The annuals are among the brightest and most easily grown of the spring and summer flowering plants; some are well fitted for use in formal flower beds, others may be sown or planted in the herbaceous border, while a number are suitable for providing cut flowers.

Half-Hardy Annuals.

If strong plants are required for planting out in June it is advisable to sow the seed in March or early April under glass. The temperature of the heated frame or greenhouse should be not less than 55 degrees, and the seed should be sown in boxes or pans. After hardening off the seedlings may be placed in the open at any time during June, provided the weather be suitable. Failing an opportunity of raising the seedlings in heat the seed may be sown in the open in May, a sunny corner of the nursery garden being selected for the purpose. Half-hardy annuals require a well-tilled soil; the seedlings should be planted with a trowel, dwarf plants being 6-in. apart and taller sorts 9-in. to 12-in. apart. Water after planting and afterwards as necessary.

The chief half-hardy annuals are as follows:

ABRONIA UMBELLATA (Sand Verbena): This is a pretty trailing plant with pink, fragrant Verbena-like flowers from June to August. It grows to a height of 4-in. and makes a charming edging plant for a sunny border and also shows to advantage when massed in the rock garden. It requires a light soil.

AGATHÆA COELESTIS: The blue flowers appear from June to October on plants reaching a height of 12-in.

AGERATUM: Some varieties are suitable for the border, while others are so small that they make excellent edging plants. The flowers, which are in bloom from July to October, are of various shades of blue. Of the taller growing sorts Mexicanum, 18-in., is recommended; of the dwarf varieties, Blue Star and Mauve Beauty, 5-in., are the best.

ALONSOA (Mask Flower): The scarlet flowers from June to September are set off by the rich green foliage. The most popular variety is the A. Warscewickzii which grows to 2-ft., but there is also a compacta variety which only reaches 12-in.

ARCTOTIS GRANDIS: When grown in a sunny, yet sheltered spot the white, daisy-like flowers with their yellow zone at the base of the floret, make a charming display from June to September. Height 2-ft.

ASTER: The China and other branching varieties are among the most delightful of the half-hardy annuals. There is a large number of varieties of many colours and of differing heights from 6-in. to 18-in. Among the smaller-growing sorts are Dwarf Bouquet, Comet, Victoria and Mignon; of the larger there is no more attractive kind than the Ostrich Plume Aster. The flowers are produced from July to September.

CELOSIA: The feathery plumes of scarlet, orange and yellow make a wonderful display during the summer, but, unfortunately, this subject can only be grown in sunny beds in the southern counties; it cannot be recommended for northern gardens. The tall varieties attain a height of 2-ft.; the dwarfs 1-ft.

COSMOS (Mexican Aster): Of the two types of this plant that known as the early-flowering should be selected. These graceful plants grow to a height of 3-ft. to 4-ft. and bear large, rose, crimson and white flowers, somewhat similar to single Dahlias, from July to October.

Cuphea (Cigar Flower): This is only suitable for use as an edging plant; the small tubular flowers, scarlet with a white tip, are delightful in the summer in the front of the herbaceous border.

Dimorphotheca aurantiaca (Star of the Veldt): This plant is particularly suitable for seaside gardens. In height about 12-in. the plants are of free-flowering, branching habit, while the flowers, often over 2-in. in diameter, are orange yellow with a dark disc, surrounded by a black zone. The flowers are produced in summer.

Gaillardia: The plant really belongs to the perennial group, but certain varieties, such as Crimson Glow, Lorenziana and the Bride are best grown as half-hardy annuals. The flowers vary in colour from sulphur to deep yellow, and to crimson and purple and are gorgeous in appearance. The plants grow to a height of 2-ft. to 3-ft. and the flowers are produced from June to September.

Gomphrena globosa (Globe Amaranthus): The orange, purple, white and other coloured flowers are so-called everlasting; they are useful for winter decoration. The plants attain a height of 12-in. and the flowers appear in July and continue to the end of September.

Ipomœa (Morning Glory): This subject is of a climbing habit and is suitable for a sunny trellis or south wall. The flowers, in many delightful colours, continue from July to September.

Kochia (Summer Cypress): The feathery green foliage in perfect pyramid form of this 2-ft. to 3-ft. tall plant makes a splendid feature when used as a " dot " plant among smaller-growing plants during the summer, but is at its best in the autumn when the whole assumes a lovely shade of crimson.

MATTHIOLA (Stock): The old-world flowers possess a special charm and among them there is nothing more delightful than the Stock with its rich colour and fragrance. Some types are hardy; it is the Ten Week and one or two other varieties which must be treated as half-hardy. These can hardly be planted too freely, as they are among the most valuable of the many summer-flowering subjects.

NEMESIA: This annual is of fairly recent introduction but, nevertheless, is one that can be strongly recommended if a good strain be procured. The flowers, of various hues, are known for their size and richness of colour, these appearing in July and August. Height 12-in.

NICOTIANA (Tobacco Plant): The flowers are produced rather late in the summer, but these ornamental plants, growing to a height of from 3-ft. to 5-ft. should find a place in every garden on account of their perfume, which is most marked in the evening. The N. affinis with white flowers is the most fragrant, but when various colours are desired the N. Sanderae is recommended.

PHLOX DRUMMONDII: The vast majority of the Phloxes are perennials, but this variety should always be grown as a half-hardy annual. The plant is of semi-creeping habit and quickly covers a large area if the shoots be pegged down. A charming display can be made in any bed in summer by using Pink Beauty, Snowball and Fireball alone.

RHODANTHE: This subject is not only eminently suitable for garden decoration, but if the various coloured flowers be cut before they open—they appear from June to October

—they will remain in perfect condition for months during the winter. The finest variety is, perhaps, R. maculata which bears crimson, rose and white single and double flowers, but the R. Manglesi, with its rose-coloured blooms runs it a very close second.

SALPIGLOSSIS : This is a subject that is sadly neglected by the vast majority of amateur gardeners. The funnel-shaped flowers are produced in many striking colours and all are large and beautifully veined. The plants grow to 18-in. and the flowers are borne from July to September.

TAGETES (African and French Marigolds) : To maintain the late summer and autumn display of flowers in the herbaceous border these plants, with their yellow and orange flowers, should be planted freely. The African varieties grow to a height of 2-ft. to 5-ft., the French sorts from 6-in. to 12-in.

ZINNIA : This subject requires a light soil and must be planted in a sunny position. The flowers, borne from July to October on plants reaching a height of 24-in., are of various colours, such as crimson and orange.

Hardy Annuals.

Rightly speaking, the hardy annuals should be sown in the spring, but one of the main secrets of success in the cultivation of this group of subjects is to sow the seed the previous summer, so that the plants are well established before the winter. Summer sowing results in plants that are far larger and stronger than those raised from a spring sowing and they come into bloom much earlier, and the flowering period is considerably longer ; therefore, an advantage is secured early and late.

In the northern counties the end of July is the best time for sowing in the summer, but in the south August is early enough and in extremely mild districts September is none too late. The aim should be to have the plants sufficiently advanced in growth, yet not so forward that they will suffer unduly in severe weather. The seed should be sown in the nursery garden and the seedlings transferred to their blooming quarters in October, unless the district be a very cold one, in which case it is advisable to transplant the summer sown annuals in a sunny bed, inserting them in their flowering quarters in early spring. In the former case, three or four plants should be lifted together with plenty of soil round their roots and planted without separating them, putting the clumps about 9-in. apart. As soon as the plants start into active growth in the early spring the weakest should be pulled up, so as to leave room for the stronger to mature properly. The hardy annuals, for which summer sowing is specially recommended, are starred in the appended list of subjects.

If summer sowing be not practised all of the hardy annuals should be sown in their permanent quarters towards the end of March or at the beginning of April; if the winter has been exceptionally severe and there has been a considerable amount of loss among the summer sown plants the deficiency can be made good by sowing extra seeds at this time. The seeds may be sown either in drills or broadcast, the seedlings being thinned as necessary when large enough to handle. The smaller growing plants should be 9-in. apart; the larger 12-in. asunder.

The following are the best hardy annuals:

*ALYSSUM: The white Alyssum, 9-in. to

12-in. in height, is an excellent subject for the herbaceous border, flowering as it does from June to September. The smaller varieties, such as Little Dorrit and Minimum, 4-in. high, are, however, preferable for use as an edging to the flower beds.

*CALENDULA (Pot Marigold): The large orange and yellow flowers are produced from July to October in great profusion. The plants attain a height of 1-ft.

CALLIOPSIS (Coreopsis): This free-blooming subject is essentially a plant for the large border, since they are splendid in bold groups. The plants grow to a height of 18-in. to 3-ft., and the brightly crimson and yellow flowers from July to September, are borne on long, slender stems. This is a good subject for cut flowers. An especially showy variety is C. Drummondii with its yellow and bronze blooms.

*CANYDTUFT: Candytuft may be looked upon as one of the indispensable hardy annuals, as it is excellent for borders, beds and edging. The crimson, white, purple and other coloured flowers are borne from July to September, the plants varying in height from 6-in. to 15-in.

*CENTAUREA (Cornflower): The annual varieties are particularly useful for cutting purposes, since the blue, white, pink, mauve and various coloured flowers are produced on long stems from July to October. The plants grow from 2-ft. to 3-ft. tall.

CHRYSANTHEMUM: The annual Chrysanthemums serve a useful purpose in the herbaceous border, for they are vigorous in growth and produce a profusion of Marguerite-like flowers in various colours from July to September. Specially good varieties are The Sultan, maroon; White Pearl, double white; Evening

Star, yellow; Morning Star, primrose, all from 2-ft. to 3-ft. tall.

*CLARKIA: The abundance of spikes of glorious flowers in a wonderful range of colours renders this subject one of the most showy of all the hardy annuals. The flowers are produced from July to September; the plants reach a height of 18-in.

*COLLINSIA: The C. bicolour and C. grandiflora, the former bearing purple and white and the latter purple flowers from July to October, are both easily grown. They are showy plants, attaining a height of 2-ft.

DELPHINIUM (Annual Larkspur): Unlike the vast majority of hardy annuals this subject requires a rich soil to give of its best. The plants—2-ft. to 3-ft. tall—should be grouped in bold masses, when they are very striking. The chief colours are mauve, white, blue and rosy-scarlet.

*ESCHSCHOLTZIA: A hot, sunny position is preferred by this subject, when it will bloom freely, making a fine display in the herbaceous border. In height from 9-in. to 12-in. the flowers are produced in a variety of colours, the chief being yellow, fiery-red, orange crimson, rose and white, from June to September.

EUTOCA: The variety E. viscida, with its intense blue flowers, should be cultivated in every garden. The flowers in July, August and September on the 12-in. high plants make a grand splash of colour.

*GILIA: G. tricolour, with its violet, yellow and white blooms is one of the best varieties of this charming plant. The flowers are at their best from June to August; height 9-in. to 12-in.

*GODETIA: When grouped in bold masses

in the herbaceous border these plants make an attractive display. Various colours can be obtained, such as crimson, white, red, rosy-crimson and coral-pink, the flowers appearing from July to September. Height 12-in.

GYPSOPHILA ELEGANS: This is a dual purpose annual, since it is not only a decorative subject for the border, but the flowers, chiefly pink in colour, are excellent for cutting from June to September. Height 9-in. to 18-in.

HELIANTHUS (Sunflower): The tall varieties, reaching a height of anything up to 8-ft. are useful for grouping at the back of a deep herbaceous border, but the smaller-growing sorts are, perhaps, more attractive. The flowers are borne from June to October.

LATHYRUS (Sweet Pea): The Sweet Pea is such a popular flower and lends itself so well to special growing that details concerning its cultivation are given fully in Chapter VIII.

LAVATERA (Mallow): The plants must be spaced well apart, since although they only reach a height of about 2-ft. they frequently spread out to quite 2-ft. across. Rose is the chief colour, but Loveliness is a richly-coloured variety, possessing bronze-green foliage and rose-pink flowers. A white variety, L. alba splendens, is also available. Flowering period, July to October.

*LIMNANTHES: The L. Douglasii is a fragrant yellow and white flowered variety, 6-in. in height, producing a wealth of bloom in June and July.

LINARIA MAROCCANA (Toad-flax): The white flowers in June and July are valuable in both borders and beds. Other varieties may be secured in different colours. Height 12-in.

LINUM: The showy, slender plants, growing to a height of 6-in. to 12-in. bear a profusion of brilliant flowers. L. grandiflorum rubrum (Scarlet Flax) is specially recommended on account of its bright red flowers in July and August.

LUPIN : A large number of different varieties of Lupin are grown in many distinct shades and colours of bloom. The flowers are at their best from July to September. Height 2-ft.

MALOPE : The Malope are bushy subjects, and, therefore, require plenty of room. The plants should be inserted 18-in. apart. Red, white, crimson, rose and other coloured flowers are borne from July to October. Height 2-ft. to 3-ft.

MATTHIOLA BICORNIS (Night-Scented Stock) : This is not a showy plant, but it should be freely grown—especially in beds beneath the windows – since it possesses a delightful scent. The lilac-coloured flowers continue from July to September. Height 12-in.

NASTURTIUM : The tall varieties, 6-ft., are suitable for trelliage and walls ; the dwarf kinds, 6-in , make ideal edgings. The various coloured flowers last from the beginning of June until well into October.

*NEMOPHILA INSIGNIS (California Bluebell) : The blue flowers with their white centres are borne in profusion in June and July. A dry, sunny spot is preferred. Height 9-in. to 15-in.

*NIGELLA (Love-in-a-Mist) : Either for massing in the herbaceous border or for cutting it is difficult to find a more charming subject than Love-in-a-Mist. Throughout the months of July, August, September and October the blue flowers make a striking display, while many of the blooms may be cut without interfering with the appearance of the border. Miss Jekyll, cornflower blue, is one of the best known varieties. Height 12-in. to 18-in.

PAPAVER (Poppy): All kinds of Poppies should be grown in masses in the borders. The Shirley Poppy is remarkable for its brilliant colours and graceful form, but a place should also be found for the Carnation-flowered, the Tulip, the French Ranunculus Poppy and the Paeony-flowered, since all are delightful The flowers, of all colours and shades, are borne in June and July. Height 12-in. to 24-in.

RESEDA (Mignonette): This old-world flower which blooms from June to September, should find a place in every garden, but perhaps its true position is in the scented garden when one is established. Matchet, Mile's Spiral, Cloth of Gold and Yellow Prince are specially fine varieties. Height 12-in.

SWEET SULTAN: The white, purple, mauve and golden flowers of this recently improved subject make a magnificent display from June to August when grown in large clumps in the border. Height 18-in.

VIRGINIAN STOCK: This subject blooms about seven weeks after sowing and is, therefore, one of the earliest to flower, while it continues to delight the eye until towards the end of August. White, pink and mauve are the principal colours. Height 9-in.

*WHITLAVIA GRANDIFLORA: The blue flowers of this subject, borne in summer, resemble a Gloxinia in shape. A light, rich soil is essential. Height 12-in.

Biennials.

A true biennial is one that flowers the year following that in which the seed is sown and perishes after it has bloomed. Many perennials are, however, treated as biennials, since the finest flowers are secured by raising fresh plants from seed each year. It has already been suggested that many hardy annuals are best treated as biennials, since they bloom more freely as well as earlier when the seed is sown the previous summer. These have already been discussed, however, so there is no justification for classing them under the above heading and mentioning them again here.

The seed should be sown in the open in May or June—the colder the district the earlier. When the seedlings are large enough to handle they should be transplanted in rows 9-in. apart and 6-in. asunder in a sunny border or corner of the nursery garden. The hardy biennials may be planted out into their flowering quarters in October, but the more delicate should be wintered in a frost-proof frame and planted out in the early spring. The half-hardy biennials, starred in the following list, may also be sown in heat early in the year and grown as half-hardy annuals. The flowering period is during the summer.

The best biennials are as follows :

***ALTHÆA ROSEA** (Hollyhock) : There are some wonderful colours among the present-day Hollyhocks, while both single and double varieties may be secured. Height 6-ft., distance apart 2-ft.

***AMMOBIUM GRANDIFLORUM** (Winged Everlasting) : This is a very attractive everlasting flower, in white with yellow centre. Height 2-ft., distance apart 15-in.

CAMPANULA CALYCANTHEMA (Canterbury Bell): This is a very imposing plant with its single, double and cup-and-saucer varieties of flowers in a wide range of colours. Height 2-ft. to 3-ft., distance apart 18-in.

CAMPANULA PYRAMIDALIS (Chimney Bellflower) : This is a much taller growing subject than the Canterbury Bell, attaining, as it does, a height of about 5-ft. Blue is the ruling colour, but there is a white variety. Distance apart 2-ft. In cold districts this subject should be looked upon as only half-hardy and wintered in a frost-proof frame.

CHEIRANTHUS (Wallflower) : Wallflowers require a firm, fairly rich soil and an open, sunny position. The flowers are of various colours. Height 9-in., distance apart 9-in. The Siberian Wallflower, C. Allionii, is a very brilliant flowering plant with bright orange flowers. It is grown in the same way as the ordinary Wallflower. Height 12-in. to 15-in., distance apart 12-in.

DIANTHUS BARBATUS (Sweet William) : Hardy and easily grown this subject gives a delightful old-fashioned touch to the herbaceous border when planted in conjunction with Stocks and Wallflowers. The self-coloured sorts are particularly handsome, Pink Beauty, Scarlet Beauty and Giant White being among the best, but the Pheasant's Eye, Auricula eyed and other double varieties are also charming. The plants vary in height from 9-in. to 15-in., and should be planted 9-in. apart.

DIANTHUS CHINENSIS (Indian or Chinese Pink) : These plants have a prolonged blooming period and being very showy are eminently suitable for the herbaceous border. The flowers are rich and varied in colouring. Height 9-in., distance apart 9-in. To secure the best blooms a little old mortar rubble should be mixed with the soil.

DIGITALIS (Foxglove) : Although suitable for grouping in bold clumps at the back of a shady portion of a deep border, the real position for the Foxglove is in the shrubbery or in the wild garden when space permits for the creation of the last mentioned. White is the predominating colour, but there are other varieties in shades of numerous colours. This subject is self-seeding; the seedlings should be lifted when large enough to handle and planted where required. Height 6-ft, distance apart 2-ft.

Erysimum (Fairy Wallflower): These are showy little plants about 15-in. in height and as they flower in spring they are suitable for the borders. The seeds are best sown in September where the plants are to bloom when this can be arranged. Distance apart 10-in.

Lunaria (Honesty): The chief value of this plant is its silvery seed pods, although the white and purple flowers which open in early summer are also decorative. Height 2-ft. to 3-ft., distance apart 15-in.

Matthiola (Stock): The Stocks classed with the biennials are those of the East Lothian and Brompton types, but even these may be treated as half-hardy annuals and raised from seed in heat in the early part of the year. They should be transplanted into the reserve or nursery garden for the winter, when summer sown, since they require a little protection in very severe weather. There are numerous varieties of various colours. Height 9-in. to 15-in., distance apart 6-in.

Myosotis (Forget-me-not): This is best treated as a biennial although in reality it belongs to the perennial class. The plants are self-seeding; a few of the old plants should be lifted after flowering, planted in the reserve garden and the seedlings lifted as soon as they are large enough, when they may be transplanted in the nursery garden for the summer. There is a large number of excellent varieties, specially good ones being M. dissitiflora, light blue, M. alba, white, alpestris, blue and rosea, rose. Height 12-in., to 18-in., distance apart 10-in.

OENOTHERA (Evening Primrose) : The tall-growing varieties, such as Oe. biennis and Oe. Lamarckiana, reach a height of about 3-ft. and are suitable for the mixed border ; other types, such as Oe. macrocarpa, are of trailing habit and only attain a height of about 9-in. The flowers are yellow in colour and borne in great profusion. Distance apart 12-in. and 4-in. respectively.

PRIMULA VULGARIS (Polyanthus) : A handsome display is furnished in late spring and early summer when various coloured Polyanthi are planted in the herbaceous border, while in a mild winter it is not at all uncommon to find that some of the plants are in bloom. To grow this subject to perfection a fairly moist, loamy soil is preferable, while partial shade is also beneficial. Height 6-in. to 9-in., distance apart 9-in.

*SCABIOSA (Scabious) : The large-flowered, highly coloured varieties of Scabious, together with the mauve-flowered Caucasian Scabious are best grown as biennials, although they really belong to the perennial group. The tall-growing type reach a height of 2-ft. ; the dwarf type of 1-ft., distance apart 9-in. and 6-in. respectively. Of the tall-growing sorts Black Prince, Fireball, Snowball and Azure Fairy are useful for cutting.

*VERBASCUM (Mullein) : Some of the Mulleins are perennials and should be treated as such, but a number are biennials, such as Blattaria, longifolium, Thapsus and Olympicum. The plants are tall-growing, varying in height from 3-ft. to 8-ft., and vigorous, bearing a profusion of small flowers, usually of a yellow hue, although at the present time there are named varieties of various colours. Distance apart from 18-in. to 30-in. according to variety.

VIOLA (Viola and Pansy): The small-flowered Violas may be raised from seed, but better results are obtained with the large-flowered sorts when they are propagated by cuttings. All pansies may, however, be raised successfully from seed; in fact, this is the most satisfactory method of reproducing them. The most suitable Violas are found among the V. cornuta, a tufted variety of compact growth which bears a profusion of bloom; and the V. gracilis, which is of low growth and chiefly suitable for the rock garden where its purple flowers make a delightful display in spring.

VIOLA ODORATA (Sweet Violet): To obtain the finest blooms this perennial should be treated as a biennial and a fresh supply of plants raised every year. A partially shaded position is the most suitable, while the soil should be deeply dug and have a considerable proportion of leaf mould mixed with it. Violets are best raised from rooted "runners" in May, these being transplanted to their permanent quarters, but they may also be increased by division. During the summer all runners should be cut off, so that the strength of the plant is not wasted. To secure a continuation of flowers a bed may be made up under a south wall for an early crop, on an east border for a medium crop and on a south border for a late crop. Violets may also be obtained in winter under glass, for the cultivation of which see Chapter X. Excellent varieties for outdoor culture are White Czar, white; Admiral Avellan, rose; Perle Rose, rose; good double violets are de Parme, lavender blue; Comte de Brazza, white; Marie Louise, lavender blue; and Neapolitan, mauve blue with white centre; single violet shade varieties suitable for the amateur gardener are La France, Mrs. Lloyd George and Princess of Wales.

Perennials.

A large number of perennials are best raised from seed, while others may be propagated more successfully by division. When plants are to be raised from seed it is important to sow in good time, say early in May; otherwise there is little chance of the plants producing flowers the following year, as they undoubtedly should. When possible, those perennials which lend themselves to raising from seed should be raised at home, since this is more economical than buying established plants in the spring. Not only is it more economical, but one's interest is stimulated when all the plants are home-produced. In the following list those which can most readily be raised from seed are starred:

ACONITUM (Monkshood): These plants make an imposing array when planted at the back of a deep herbaceous border, attaining as they do a height of 4-ft. to 6-ft. Among the best varieties are the A. bicolour—blue and white—which flower from June to October.

*ANCHUSA (Alkanet): The vivid blue flowers of this subject from June to September make a welcome addition to the usual subjects grown in the herbaceous border. Height 4-ft.

*ANEMONE JAPONICA (Windflower): Although flowering from August to October the rose and white Windflowers are at their best during

September. Partial shade is beneficial. Height 3-ft. to 4-ft., distance apart 18-in.

AQUILEGIA (Columbine) : The various coloured flowers appear in May and June on plants attaining a height of 12-in. to 3-ft. according to variety, distance apart 15-in.

ASTER (Michaelmas Daisy) : These are invaluable in big masses in the herbaceous border as they carry on the flowering period until well into November, although the first blooms appear as early as June. There is a large number of varieties from 18-in. to 5-ft. in height, distance apart 24-in.

ASTILBE (Spiræa) : The feathery plumes of this subject form its most attractive feature, the flowers being borne from May to August in various colours, such as rose, pink, purple and white. Height 3-ft. to 5-ft., distance apart 24-in.

BOCCONIA CORDATA (Plume Poppy) : The tall-flowering stems, bearing creamy white flowers from June to October, are set off in a beautiful manner by the attractive foliage of this charming perennial. Height 4-ft. to 6-ft., distance apart 3-ft.

CARNATION : The border Carnation is often looked down upon, since it is believed that it is not worthy a place in the beds and borders. This is perfectly correct when it is grown as a biennial ; it is a perennial and when allowed to remain in the ground for three or four years it makes a splendid display with its beautifully scented flowers. Propagation is by layering, the layers being laid down in July. The new plants should be well rooted by September, when they may be planted in their flowering quarters. In such circumstances the amateur may confidently expect a successful flowering season the following year and a greater abundance of bloom in subsequent years. Border Carnations are also easily raised from seed, but do not always come true to type and colour. The seed should be sown in a slightly heated house or frame in February or early March. Height 12-in. to 18-in., distance apart 10-in.

***CHRYSANTHEMUM** : The perennial Chrysanthemums, Ox-eye Daisy or Shasta Daisy as they are called, are very useful and quite easily grown. The white flowers are borne from June to September on plants from 2-ft. to 3-ft. in height. Distance apart 18-in.

COREOPSIS GRANDIFLORA (Tickseed) : This is frequently treated as a biennial, and also as a perennial. The yellow flowers appear in August and September on plants about 3-ft. in height. Distance apart 18-in.

***DELPHINIUM** (Perennial Larkspur) : There is a very large number of varieties of this delightful subject. The principal colour is white, but varieties are also available in shades of blue and mauve. The flowers are borne from June to September. Height 3-ft. to 6-ft., distance apart 24-in.

DORONICUM (Leopard's Bane) : The golden yellow flowers come early in the year, from March to May, and are somewhat similar to large Daisies. Height 2-ft. to 3-ft., distance apart 15-in.

EREMURUS ROBUSTUS (Fox-Tail Lily) : Best placed at the back of a deep herbaceous border, so that its large leaves are hidden. The rose-pink flowers come in June. Height 3-ft., distance apart 15-in.

***ERIGERON SPECIOSUS** (Summer Starwort) : This is a particularly valuable border plant since it remains in bloom from May to October

The various coloured flowers are produced on plants from 2-ft. to 3-ft. tall; distance apart 12-in.

***Eryngium Oliverianum** (Sea Holly): The charm of this subject lies in its steel blue leaves and stems. Height 3-ft., distance apart 15-in.

***Gaillardia grandiflora** (Blanket Flower): An abundance of gaily coloured flowers are produced by the 2-ft. to 3-ft. tall plant in May and June. Distance apart 15-in.

***Galega** (Goat's Rue): This is a very showy perennial reaching a height of 4-ft., with blue, lilac, white and various coloured flowers from June to August. Distance apart 2-ft.

***Geum** (Avens): The brilliant scarlet of the Geum flowers from May to July makes a delightful splash of colour in the border. Height 2-ft., distance apart 12-in.

***Helenium** (Sneezewort): The yellow, crimson and bronze flowers are excellent for autumn decoration of the border, for they are at their best from August to the beginning of November. Height 3-ft. to 5-ft., distance apart 2-ft.

Helianthus (Perennial Sunflower): Growing to a height of 6-ft. to 8-ft. this subject is most suitable for the back of a deep border. The yellow and orange-shaded flowers continue from August to October. Distance apart 18-in.

***Heuchera** (Alum Root): The delightful various coloured flowers of this plant are at their best during May and June, but continue until August. Height 18-in. to 24-in., distance apart 12-in.

Kniphofia aloides (Red Hot Poker): Provides glowing colour in orange, yellow and scarlet from July to October. Height 3-ft. to 5-ft., distance apart 2-ft.

Lavatera Olbia (Mallow): This is the best of the perennial Mallows. The flowers are rose-pink and appear in July and August. Height 3-ft., distance apart 15-in.

LILIUM (Lily) : The best Lilies for the amateur to grow are as follows : L. Batemanniae, 2-ft., apricot, August, several flowers on a stem. L. Candidum (Madonna Lily), 4-ft., June. L. Chalcedonicum (Scarlet Martagon), 3-ft. July. L. croceum (Old Orange Lily), 3-ft., June. L. Hansoni, 3-ft., yellow with dark spots, June. L. Henri, 5-ft., pale apricot or orange-yellow, August. L. longiflorum Wilsoni (White Trumpet Lily), 3-ft., July. L. Pardalinum (Panther Lily), 5-ft., orange with crimson spots, July. L. Regale (Regal Lily), 3-ft., white and yellow and streaked brown, July. L. Speciosum (Japanese Lily), 3-ft., rose, crimson, etc., August and September. L. Tigrinum (Tiger Lily), 4-ft. to 5-ft., orange with black spots, August and September. L. Umbellatum, 2-ft., orange, red and other shades, June and July. Select medium sized bulbs rather than large, plant from 4-in. to 6-in. deep, the Madonna Lily in August, the remainder from November onwards when the bulbs are available. For Lilies under glass, see Chapter X.

LUPINUS POLYPHYLLUS (Lupin) : The new hybrids comprise many charming shades of colour, the flowers appearing in May and June. Height 2-ft., distance apart 12-in.

*LYCHNIS (Campion) : The scarlet flowers on this old and showy garden plant provide glowing colour from June to September. Height 2-ft. to 3-ft., distance apart 18-in.

*MONARDA DIDYMA (Bergamot) : This subject has fragrant foliage, while the scarlet flowers are borne in July and August on plants 2-ft. to 3-ft. tall. Distance apart 18-in.

PAEONIES HERBACEOUS: These may be had in various colours to flower in May and June. Height 2-ft. to 3-ft., distance apart 2-ft.

*PAPAVER ORIENTALE (Oriental Poppy): This is a very beautiful subject, perhaps the best varieties being the Royal Scarlet and Jenny Mawson (salmon) which flower in May and June. Height 2-ft. to 3-ft., distance apart 15-in.

*PHLOX DECUSSATA (Flame Fire): This is a valuable subject, as it is at its best during August, although continuing to flower from July to October. Height 18-in. to 3-ft., distance apart 15-in.

*PINK: This is among the most delightful of the old-world fragrant flowers and should be grown in every garden. Propagation by means of pipings; that is, by inserting the points of the shoots when they are pulled out instead of being cut off as is customary with cuttings. They may also be increased by division, while they are easily raised from seed. The perpetual Flowering Pink (Dianthus Allwoodii) is an excellent type, since it is an almost continuous bloomer. Height 12-in. to 15-in., distance apart 10-in.

*RUDBECKA (Cone Flower): The flowers, which appear in September, are chiefly yellow. Height 4-ft. to 8-ft., distance apart 2-ft.

SALVIA VIRGATA NEMOROSA (Purple Sage): This is a very handsome border plant with violet-blue flowers in August and September. Height 2-ft. to 3-ft., distance apart 15-in.

SCABIOSA CAUCASICA (Pincushion Flower): There is a number of beautiful varieties in white and shades of lavender and mauve which bear their flowers from June to August. Height 2-ft. to 3-ft., distance apart 18-in.

SALIDAGO (Golden Rod): This makes a bright display in September and October with its yellow bloom. Height 5-ft., distance apart 2-ft.

VERBASCUM (Mullein): The perennial Mulleins bear yellow and orange-shaded flowers in July and August. Height 2-ft. to 3-ft., distance apart 15-in.

VERONICA SPICATA (Speedwell): The blue flowers on this 2-ft. tall plant are produced in June and July. Distance apart 9-in.

Half-Hardy Summer Bedding Plants.

The following are useful half-hardy summer bedding plants:

AGERATUM, tender perennial, seeds or cuttings, white or blue, 6-in. high, 9-in. apart.

BEGONIA, half-hardy bulb, seeds and division, various colours, 12-in. high, 12-in. apart.

CENTAUREA CANDIDISSIMA, half-hardy perennial, seeds, white foliage, 9-in. high, 9-in. apart.

CINERARIA MARITIMA, half-hardy perennial, seeds or cuttings, silvery foliage, 24-in. high, 12-in. apart.

DAHLIA (Mignon or Tom Thumb), half-hardy tubers, cuttings and divisions, various colours, 15-in. to 18-in. high, 15-in. apart.

FUCHSIA, half-hardy shrub, cuttings, various colours, 18-in. to 3-ft. high, 12-in. to 24-in. apart.

GERANIUM, ZONAL, half-hardy evergreen, cuttings, various colours, 15-in. high, 10-in. apart.

GERANIUM, Ivy-leaved, half-hardy evergreen, cuttings, various colours, trailing, 10-in. apart.

GERANIUM, Scented-leaved half-hardy evergreen, cuttings, various colours, 12-in. high, 9-in. apart.

GLADIOLUS, bulb, seeds and offsets, various colours, 18-in. to 3-ft. high, 9-in. apart.

Heliotrope, tender shrub seeds and cuttings, white, mauve or purple, 6-in. high, 6-in. apart.

Lobelia erinus and hybrids, tender perennial, seeds and cuttings, blue, white, pink and purple, 6-in. high, 6-in. apart.

Petunia, half-hardy annual, seeds, various colours, 9-in. to 12-in. high, 9-in. apart.

Salvia splendens and its varieties, half-hardy, shrubby, seeds and cuttings, scarlet and crimson, 15-in. high, 10-in. apart.

Verbena, half-hardy perennial, seeds and cuttings, various colours, trailing, 9-in. apart.

METHODS OF PROPAGATION

There is a number of methods of propagation practised in the flower garden, these being by seeds, under glass or in the open ; from cuttings ; by means of leaf and roots cuttings ; by division ; and by layering. Roses are generally budded, while grafting is a common practice in the fruit garden ; for these methods see Chapters VIII and XIV respectively.

Sowing under Glass.

Seed boxes, flower pots or pans should be employed, these being holed for drainage purposes, with a few pieces of broken pot in the bottom covered with a little coarse soil and then filled with fine rich soil. The seeds should be broadcast on the surface, after watering the soil a couple of hours beforehand, and just covered with a sprinkling of fine soil. Place in a frost-proof house or heated frame and keep the soil uniformly moist.

When the seedlings are established they should be hardened off before being planted out into the open. The seedlings should receive less and less protection, being placed into a cold frame, until such time as it is possible to leave the lights off day and night. The length of time occupied by the hardening off process cannot be stated definitely, since so much depends upon the general weather conditions prevailing, but must be left to the gardener's discretion.

The day before the seedlings are to be planted out they should be well watered, as they cannot be lifted when the soil is dry. When transplanting, the boxes should be broken, if these be used, and in all cases the plants should be lifted with as much soil adhering to their roots as possible. If the outside ground be dry the necessary number of holes should be made with a dibber an hour beforehand and filled with water. After the plants are inserted the earth should be drawn round them and watered again.

After planting out the ground must be kept clear of weeds by constant use of the hoe, which will also tend to conserve the moisture in the soil.

Sowing in the Open.

The spring-sown annuals are the only flowering plants that can be sown where they are to bloom; as far as possible the inmates of the vegetable garden should be sown direct into their permanent quarters. When sowing in the open the following rules should be attended to: Secure a fine tilth by plying the iron rake up and down and across the plot three or four times in each direction, then finish off with the wooden rake; sow in drills, making these of an even depth and perfectly straight employing an ordinary draw hoe or one edge of the rake for the purpose; mix small seeds with sand, so as to make it easier to distribute them evenly; take the seeds in the palm of the hand, holding the hand close to the drill with the knuckles downward and the thumb pointing towards the ground, then roll the seed out by working the thumb over the finger; sow evenly and thinly; cover with soil by dragging the feet along the ground and pushing the soil into the drill with the heels; and mark each row with a properly written label, giving full particulars of the seeds sown.

The Growing Plants.

Keep the hoe at work almost daily among the young plants. Although thin sowing has been adopted more seeds must be sown than necessary; therefore, thin as the plants begin to increase in size until they are the correct distance apart. Always water the ground the day before thinning, so that those remaining will not be disturbed.

The ground must be kept uniformly moist, but a slight sprinkling is useless since this causes the roots to come to the surface rather than strike downwards. Always water copiously when the need arises.

Staking with many subjects is an essential duty. The plants in the reserve or nursery garden that require it are best supported on twiggy branches, since this saves all trouble of tying.

Increase by Cuttings.

Some cuttings must be rooted under glass, others in a cold frame, but the majority may be kept in the open during the summer. In all cases they should be struck in boxes or pots.

The cuttings are made from young tips, these being long enough to allow for two joints above the soil and two below. A sharp knife should be used, excepting in the case of Pinks where the "pipings" are pulled out, as a clean cut is essential. The two bottom leaves should be removed and the lower end cut level directly below a joint. If pots be used four to six cuttings should be placed round the edge of "large sixties."

A useful compost for the vast majority of cuttings consists of sifted loam and leaf mould in equal parts with a free admixture of sand. A little sand should also be sprinkled over the surface of the soil, so that it will trickle into the holes as they are made for the reception of the cuttings. After insertion they should be watered in to settle them. Afterwards the soil should be kept just moist. The cuttings, when rooted in the open, should be removed under glass towards the end of September, as excessive rain is detrimental to them.

Increase by Leaf and Root Cuttings.

For plants of a succulent nature, such as Begonias and Gloxinias, propagation by leaf cuttings is recommended. A fully grown leaf is taken, two-thirds of the stalk removed and the leaf placed, stalk downwards, in a light sandy soil over bottom heat in a propagating case. Thick leaved plants may be treated slightly differently. The thick veins on the lower side of the leaf should be notched where they fork out and the stalk placed in sandy soil and the leaf pegged down, so that the notches rest on the soil. Placed in a propagating case roots will form at each notch.

A large number of plants, such as herbaceous

Anemones, Gaillardia, Geranium and Paeony, may be propagated by means of root cuttings. Pieces of root, about ½-in. thick and some 4-in. long, are cut off the old roots when these are lifted in the autumn. One end is cut straight, the other slanting and the root is placed upright in the soil with the straight-cut end about 1-in. below the surface of the soil. The soil should be of a sandy nature and the cuttings should be placed in a slightly heated frame.

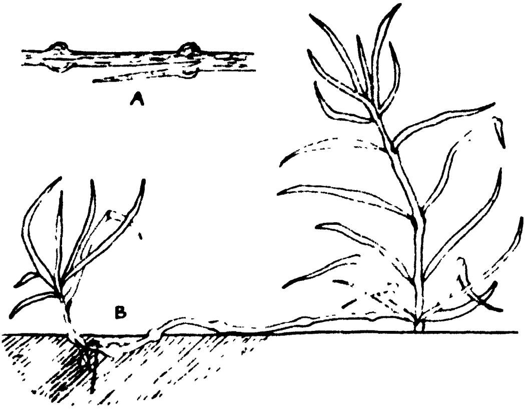

FIG. 14

Increase by Division.

This is the simplest of all methods of propagating and is the one usually employed with the perennial inmates of the herbaceous border. It consists in dividing the roots into suitable sized pieces, selecting those from the outside of the clumps for replanting in preference to those from towards the centre.

Increase by Layering.

Layering is the method of propagating generally employed for Carnations and Pinks, while it is also largely practised with Roses and many inmates of the shrubbery. In the case of Carnations a few leaves are stripped off that part of the shoot where the slit is to be made, that is, some 4-in. from the tip of the shoot. The slit is then made by inserting the blade of the knife in the middle of the stem, passing it through a joint and then out at the side (A, Fig. 14). The slit portion of the shoot is then pegged down into sandy soil, when it forms roots in a few weeks (B, Fig. 14). With Pinks all that is necessary is to bruise or scrape the stem before burying in the sandy soil.

Shrubs may be treated in the same manner, but more often layering is carried out by cutting off a ring of bark an inch wide and then pegging the shoot down into the soil.

CHAPTER VII

THE FLOWER BEDS AND BORDERS

THE arrangement of the flower beds and borders is a matter that depends in a very large measure upon the size of the flower garden. There is no doubt but that a number of tastefully planted beds of irregular shape surrounded by well-mown grass may be made to form a very pleasing feature in the large garden. The amateur is, however, generally restricted for room and must, perforce content himself with one or two main beds or borders. In the garden of average size the best solution of the problem is to establish one or more deep borders in which herbaceous plants may be cultivated. The herbaceous border, as it is generally termed, should always be the most attractive feature in the small garden, since it is possible, with a little foresight, to make it a thing of beauty for ten out of the twelve months.

Gardening, even in the hands of the amateur, is to-day an entirely different thing from what it was some years ago. There is a much greater breadth and freedom in planting, whereas in the olden days the plants grown were of only a few kinds, tender in constitution and garish in bloom. Dozens of different varieties of plants may find a place in the present-day herbaceous border, while with the infinite choice of subjects much more beautiful and diversified beds can be made than with the old combination of Geranium, Calceolaria and Lobelia alone. Gone, too, is the day of carpet-bedding. This was the most formal of all systems, because the plants used were low-growers with coloured leaves, arranged in bands and panels, and restricted by regular cropping with finger and thumb throughout the summer. Fortunately, this system of bedding is obsolete, excepting, perhaps, in the case of a number of public gardens where it is still practised to a limited extent with a view, as far as one can make out, of stimulating the curiosity of the cruder elements of the community. Carpet-bedding has no place in the garden beautiful.

The herbaceous border and the flower beds require different treatment, although the same subjects may be grown therein. For the sake of simplicity, therefore, it is advisable to deal with them separately. So as to present a charming and variegated appearance the herbaceous border should be of considerable depth. The space allotted to this border must, of course, depend upon the size of the garden, but it should not, in any case, be less than 8-ft., while if it can be arranged to allow a depth of 10-ft. to 12-ft. it will be all to the good. A good depth is essential, since tall-growing as well as low-growing subjects are employed for its decoration, while all classes of flowering plants are pressed into service. The border, too, should be as long as possible, so as to render it possible to have representative colours in their proper order.

A considerable proportion of the inmates of this border belong to the perennial class—subjects which only give of their best when allowed to remain in the ground for three or four years undisturbed. This suggests that the preparation of the ground when the bed is being established is of paramount importance. But even when properly worked and liberally manured it stands to reason that sufficient plant food will not be present to serve the tall-growing perennials with sufficient nourishment year after year. Plant feeding afterwards is also necessary.

In the case of an established herbaceous border it should be re-made every three or four years the exact time being decided by the growth and development of the perennials present. The question of making a new border or re-making an existing one can, therefore, be considered together. The best time of the year to start work on a new border is during October and November; the latter month should be chosen for re-making the border, since if attempted before this month much of the late autumn display will be destroyed. The selected site should be backed by a wall or trellage, the latter being particularly useful, since it can quickly be covered with suitable climbing subjects (see Chapter IV).

The whole of the ground should be trenched, the particular method of trenching adopted depending upon the quality of the top and second spits of soil. A considerable amount of rotten manure, or of a natural manure substitute, should be incorporated with the third spit of soil when it is being forked over, with a lesser amount in the second spit. If the soil be heavy it can be improved by working in a liberal quantity of road grit, wood ashes from the garden bonfire, material from the compost heap and even the remains of an old hotbed or mushroom bed, while horse manure is preferable to cow or pig manure for this class of soil Liberal manuring is advisable, since the length of the blooming period and the third and fourth year flowering of the perennials are both dependent upon the amount of plant food present.

When re-making an existing border the whole site should be dug over in the same manner, but before this can be done the majority of the perennials should be lifted. Re-making is essential, not only on account of the poverty of the soil, but because it is found that the perennials overgrow their allotted space, while if allowed to remain too long in the ground without lifting the quality and size of the blooms is decreased. The work of re-making the border should be started as soon as the first frosts have cut down the foliage. The old stems should be cut down and each root labelled so that there may be no mistakes when replanting. For the time being these plants may be planted in an odd corner of the garden, since re-making the border is bound to occupy some time. A dressing of 1-lb. of lime to every three square yards should be applied, and if it be thought that the pupæ of various insect pests be present in the soil 2-oz. of naphthalene, after crushing to a powder, should be worked into the top spit per square yard. This substance gives off fumes which will rid the soil of any pests that may be present. Before replanting the established border the perennials should be divided, the outside portions from the clumps of roots only being used again. Due regard must be paid to the distance at which the plants are inserted; if too close together the border will have to be re-made more frequently, as the various subjects will become overcrowded. It should always be remembered that half the glory of the majority of the plants used lies in their beautiful foliage with their varying tints of green, their delightful shape and their graceful form.

Planning the Herbaceous Border.

In considering the planting of the herbaceous border the amateur gardener should keep three things in view. Of first importance is the question of securing a continuation of flowers from the very early days of spring right on until the frosts of winter cut down the foliage. At no time throughout the spring, summer and autumn should the border be destitute of blooms. In the second place the question of colour must be given its due weight. In the third place the height attained by the selected subjects must be known and taken into account.

To maintain a supply of flowers during the greater part of the year is not the difficult thing that one might imagine, since all classes of plants, annuals, biennials and perennials, together with numerous bulbous subjects, can be used. When formulating the planting scheme this point should be carefully considered, the spring-flowering plants and bulbs being placed close to those which will flower in the summer, while these again will be interspersed by those which give the best of their display in the autumn. The autumn display should be the culminating point of the whole season's work, since numerous subjects will last almost until the turn of the year. Mignonette will be in flower as late as November; the Lupins will only be destroyed when cut down by the frost; the Christmas Rose and the Marigold appear to be unaffected by the changing season;

and the winter-flowering Rhododendrons, Heaths and Pampas Grass will afford a certain amount of decoration throughout the winter.

The next step when formulating the planting scheme is to work out the position of the selected varieties according to their colour. This is not the easy matter that might be thought, since it is so easy to introduce a variety of the wrong colour which will upset the whole appearance of the border. If the border be of considerable length it is quite possible to run through the whole gamut of colours ; in smaller borders it is generally advisable to introduce a smaller number of colours and shades. The colours must not, however, be arranged in any order, since many of them clash instead of blending. Contrasting colours are quite allowable, especially if these be separated by delicate shades. Attempts are sometimes made to arrange for a different colour with each flowering period, so that, for instance, the early spring flower may be all white, those following blue or yellow, with the summer-flowering subjects all in red and the autumn blooms in orange, crimson or lavender. This is not, however. a plan to be recommended, since seasons are so uncertain that one frequently finds the spring flowers lasting well into the summer ; hence the colour scheme is ruined.

If the border be a long one an excellent order in which to arrange the colours is as follows : Deep blue, light blue, pale yellow, white, pink, rose, crimson, scarlet, orange, bright yellow, pale yellow, lilac, lavender, purple and violet. In smaller borders strong colours should always be separated by delicate shades of pink, yellow, cream or white, otherwise they are apt to clash. Contrasting colours when placed together are sometimes very beautiful. Blue and orange, scarlet and blue, yellow and purple are colours which contrast well, while whole groups of plants may be planted together in different shades of the same colour.

The third point, regarding the height of the plants, is also important. If large plants be placed near the front of the border they will hide smaller-growing varieties which may be behind them. With all herbaceous borders the plants should be grouped in such a way that they form a rising bank of greenery and yet none is hidden. In the very forefront some low-growing edging plant, such as Gold Dust, Rock Cress or Thrift (see later in the chapter for edging plants), may be used. Behind this would come clumps of plants which attain a height of from 9-in. to 12-in. such as Alyssum, Brompton Stocks, Cornflowers, Linums, Mignonette, Myosotis, Shirley Poppies, Sweet William and the like. Behind these again is the right position for those subjects which reach a height of from 2-ft. to 3-ft., plants of which Aquilegias, Coreopsis, Scabious and Monardas are representative. Right at the back the tall-growing varieties will show off in all their perfection of form. Aconites, Anchusa, Chrysanthemums, Daisies, Foxgloves, Hollyhocks, Oriental Poppies and Sunflowers in this position will throw up the grace and beauty of those in front.

Although it is suggested that the taller-growing subjects should be placed at the back of the border it must not be thought that it is desirable to plant them in straight rows, since this would give too formal and unnatural an appearance to the whole. All subjects should be planted in clumps—it is a mistake to insert one or two plants of each kind only—and there is no reason why the clumps of tall-growing plants should not be brought forward in great V-shaped masses almost to the front of the border. This method of arranging breaks up the monotony of the long stretch of bed, while the smaller-growing subjects show to better advantage in the natural floral bays thus formed.

Edging Plants for the Herbaceous Border.

Many amateur gardeners hold that the flowers in the herbaceous border are seen to better advantage when a grass edging is employed. This may be correct in some cases, as, for instance, when grass lawn and border meet, but when walk and border are adjoining there is much to be said for planting special edging subjects. The following include the most suitable edging plants for this purpose:

ALYSSUM SAXATILE COMPACTUM (Gold Dust), golden-yellow flowers in April and May.

ANCHUSA MYOSOTIDIFLORA, blue flowers in July and August.

ARABIS ALBIDA (Rock Cress), white flowers in April and May.

AUBRIETIA, an evergreen subject that blooms during the greater part of the year, forming small bushy tufts. For this purpose the best varieties are Bridesmaid, blush; Fire King, crimson; Lloyd Edwards, violet purple; and Pritchard's Al, purple.

CAMPANULA CARPATICA, blue flowers in early summer; C. alba, white, early summer; and C. venusta, lavender, early summer.

GENISTA HUMIFUSA, a delightful yellow Broom.

HELIANTHEMUM (Sun Rose), red and pink in June.

IBERIS SEMPERVIRENS (Evergreen Candytuft), white in early summer.

LINUM ALPINUM, blue in early summer.

NEPATA MUSSINII (Catmint), mauve in summer.

PHLOX SUBULATA, rose in April and May.

SAXIFRAGES, the mossy varieties in rose, white and pink and white in summer.

VERONICA PROSTRAT, blue in June and July.

Violas, Thrift and Pinks are also excellent as they remain in bloom throughout the greater part of the year, while vivid splashes of colour may be introduced by planting small groups of Siberian Wallflowers, as these become smothered in orange flowers in May.

Routine Work in the Herbaceous Border.

The work in an established herbaceous border begins in September, when the summer bedding plants should be lifted, so as to make room for the bulbs and spring-flowering subjects. The amateur is frequently undecided as to whether these plants should be thrown away or kept planted in the reserve garden for another year. It depends entirely upon the ease with which these subjects can be raised from seed or cuttings and the opportunity of the gardener for so doing. If sufficient plants can be raised it is just as well to discard such subjects as Ageratums, Calceolarias, Centaureæ, Dianthus, Sweet Alyssum and Verbenas, since these are hardly worth troubling to retain. On the other hand, Begonias, Dahlias, Freesias, Fuchsias, Marguerites and similar plants should certainly be held over.

As the perennials begin to die off they should be cut down to within a few inches of the ground, but sufficient must be left to denote the position of each. Care should be taken, however, not to interfere with those subjects which remain green throughout the greater part of the winter, since they not only help to adorn the garden during the dark days of winter, but cutting them down is harmful.

Much as one would like to it is quite impossible to apply a dressing of natural manure, since forking this into the ground would disturb the roots of the permanent perennials. The best that can be done is to apply a dressing of leaf mould, old potting soil and powdery decayed manure, working this into the top 3-in. of the surface soil. If necessary a dressing of 2-oz. of powdered naphthalene may be applied to eradicate soil pests.

Although the use of natural manure is prohibited, some form of plant food should be incorporated with the soil. On heavy soil a dressing of 2-oz. basic slag and 1-oz. sulphate of potash per square yard should be applied, while on light soil 2-oz. of basic slag, 1-oz. kainit and 1-oz. steamed bones will be found more beneficial. These manures should be well mixed, sprinkled on the surface of the soil and raked in gently so that no roots will be damaged.

As soon as the border has been tidied up the spring-flowering plants, when possible, and the bulbs should be planted out. These should be got into the ground as early as possible, since they should be well established before the worst of the winter arrives. There should be no difficulty in planting out the summer-sown hardy annuals, the hardy biennials and those perennials treated as biennials, since, if well-grown, these will stand the winter in the open quite well. The spring-sown annuals and bought summer-sown annuals, however, cannot be got in until later. No spring manuring should be required, if the ground be treated as suggested in the autumn ; if the bulbs and plants appear rather weakly, however, an application of 2-oz. of superphosphates per square yard may be made. This should be applied in March and raked in.

At the first opportunity after flowering is over the spring-flowering plants and the bulbs should be lifted, so as to get the ground ready for the summer-flowering plants ; that is, the annuals and biennials of a half-hardy nature. Light forking of the ground is all that is permissible. The summer-flowering subjects may then be planted.

One of the most important duties during the greater part of the year is to keep the hoe constantly at work. Weeds must be kept down, while hoeing also conserves the moisture in the soil and, therefore, does away with a considerable amount of watering. If watering be necessary this should be done liberally, as slight sprinklings are of little avail.

All tall growing subjects should be staked as necessary so that they will not be beaten down to the ground by the rain or wind.

An eye should be kept throughout the active growing period on the taller growing perennials at the back of the border. It may be found that they are overgrowing their allotted space, in which case portions of the spreading plants should be removed. This is best done in July and August, but the exact time must depend, naturally, upon the subject in question. Any gaps should be refilled with plants from the reserve garden, so that the original scheme may still be followed. Herein lies the value of raising more plants than actually required at the time and keeping them on hand in the nursery or reserve garden.

Every week from June onwards a little feeding is beneficial to the vast majority of the inmates of the herbaceous border. The best stimulant that can be used is liquid manure prepared from horse, cow, pig, poultry or pigeon droppings, this being diluted until it assumes the colour of weak tea. In dry weather the soil should always be watered with plain water before the liquid manure is applied.

If liquid manure cannot be obtained 1-oz of the following mixture should be dissolved in each gallon of water: four parts superphosphates and half part sulphate of ammonia. This should be given every two weeks; in alternate weeks soot water can be used with advantage. When only a limited supply of liquid manure is available the changes can be rung on the three mentioned, namely, liquid manure one week, the mixture of artificials the second week, soot water the third week, coming back to the liquid manure for the fourth week, and so on.

THE FLOWER BEDS

Planning the flower beds, as apart from the herbaceous border, is a fascinating task, since so many delightful arrangements can be secured. The special beds may be employed for the cultivation of a large number of subjects, but in this connexion it should be pointed out that the finest results are generally achieved when only two different subjects are grown in each bed. If more subjects be planted, the bed assumes the appearance of an immature herbaceous border and there is nothing either charming or appealing in such a mix-up of flowering plants.

A Rose bed, consisting of standards, half-standards and bushes, with, say, a double row of Violas in front, this latter being selected so that the colour will blend with that of the Roses, is a glorious sight in itself. Equally charming, too, is the result when Sweet Peas are grown in profusion in the bed, again with Violas of a blending colour in the immediate foreground. The arrangements of such beds and the cultivation of Roses and Sweet Peas are, however, dealt with in Chapter VIII; they are mentioned here to indicate what may be done in this direction.

The flower beds should not be too regular in form, but, on the other hand, it is generally a mistake to employ intricate designs. Rounds, oblongs, crescent-shape and diamond beds are quite in order, but others which must be worked out with mathematical precision are not recommended. The beds may be planted with one or, at most, two kinds of plants. When different varieties of the subject are employed, such as Petunias, Phlox Drummondii, Salpiglossis and Verbenas, a very striking and attractive effect can be produced. This is specially so if a few "dot" plants be placed here and there; that is, plants of more stately growth.

The flower beds may be adorned during the winter months by planting therein evergreen shrubs, these being lifted and planted elsewhere for the summer. The flowering plants are divided into two classes, namely, the spring- and the summer-flowering. The beds are planted either in the autumn or early in the year with the spring-flowering subjects, these being removed after the blooming period is over when they are replaced with summer-flowering varieties. For the spring display one is dependent upon bulbs in conjunction with hardy biennials and perennials; the summer display consists of tender perennials, half-hardy and hardy annuals.

A very large number of delightful effects can be produced by using only two subjects on each occasion. One subject is the major, the majority of the plants being of this kind, while the latter is the minor, these being used chiefly as a groundwork to set off the major. In the following suggested combinations the major subject is mentioned first, with the minor second. It will be understood that at most only a very small number of plantings can be suggested; the reader is left to follow his own fancy in making other combinations from the plants available.

SPRING BEDDING SCHEMES.

Alyssum saxatile, yellow	Tulip, Pink Beauty, pink.
Alyssum saxatile, yellow	Wallflower, Vulcan, deep crimson
Arabis albida, white	Tulip, Vermillion, brilliant scarlet.
Arabis albida, white	Double Daisy, red.
Aubretia, Dr. Mules, mauve.	Tulip, La Candeur, white.
Aubretia purpurea, purple.	Darwin Tulip, Clara Butt, rose.
Erysimum compactum, yellow.	Tulip, Thomas Moore, orange
Erysimum compactum, yellow.	Viola, King of the Blues, blue.
Hyacinth, General Pelissier, crimson	Arabis albida, white
Hyacinth, Gertrude, rose-pink.	Tulip, Keizer's Kroon, red and yellow.
Myosotis, blue.	Narcissus, Emperor, yellow.
Myosotis, blue.	Tulip, Pink Beauty, pink.
Myosotis, blue.	Double Daisy, white
Narcissus, Horsfeildi, yellow.	Polyanthus, crimson
Narcissus poeticus, white.	May Tulip, Golden Crown, yellow.
Polyanthus, crimson.	Tulip, Pottebakker, yellow
Polyanthus, yellow.	Tulip, Sir Thomas Lipton, scarlet
Primrose, yellow.	Hyacinth, Gen. Pelissier, crimson.
Viola, Maggie Mott, mauve.	Tulip, Europe, rosy-scarlet.
Viola, J. B. Riding, reddish-mauve.	Tulip, Murillo, light pink.
Wallflower, Blood Red, red	Tulip, Clara Butt, rose.
Wallflower, Fire King, orange-scarlet.	Wallflower Vulcan, crimson.
Wallflower, Ruby Gem, ruby-violet.	Tulip, La Candeur, white.

SUMMER BEDDING SCHEMES.

Aster, Comet, pink
Aster, Ostrich Plume, blue.
Begonia semperflorens, Fairy Queen, pink.

Cineraria maritima, silver foliage.
Centaurea candidissima, silvery foliage.

Dahlia, Coltness Gem, scarlet
Fuchsia, Scarcity, red and white.
Geranium, Zonal, Paul Crampel, scarlet.
Gladiolus, Halley, salmon-pink.
Heliotrope, lilac.
Kochia trichophylla, green leaves, crimson in autumn.
Larkspur, Cambridge Blue, blue.
Mignonette, white, red and yellow.
Nemesia Suttoni, rose-pink
Nicotiana Sutton's Scarlet, scarlet.
Nigella, Miss Jekyll, blue.
Phlox Drummondi, white.
Stock, Ten Week, rose.

Lobelia cardinalis, scarlet
Aster, Ostrich Plume, pink.
Kochia trichophylla, green foliage, crimson in autumn.
Geranium, Madame Crousse, pink.
Geranium, Mrs. Quilter, bronze and yellow leaves.
Hyacinthus candicans, white.
Lobelia, Mrs. Clibran, blue
Centaurea candidissima, silvery foliage.
Nemesia, Blue Gem, blue
Fuchsia, Earl of Beaconsfield, pink.
Alyssum, Little Dorrit, white.

Annual Chrysanthemum, Snowball, white.
Coreopsis Drummondi, red and brown
Geranium, Maxime Kovalesky, orange-red.
Viola, Moseley Wonder, cream.
Larkspur, rosy-scarlet.
Perilla Nankinensis, purple foliage.
Ageratum mexicanum, light blue.

Shaded Beds.

Some of the flower beds are often found in shaded parts of the garden and these, too, must be beautified. The following subjects thrive well in partial shade: Aconitum, Anemone Japonica, A. sylvestris, Aquilegia, Astilbe, Campanula, Digitalis, Fuchsia, Iberis, Lilium (various), Paeony, Pansy, Papaver orientalis, P. nudicaula, Phlox, Primrose, Polyanthus, Primula, Rudbeckia, Saxifraga, Viola, Violet and Veronica.

CHAPTER VIII

ROSE, SWEET PEA AND CHRYSANTHEMUM GROWING

ROSES, Sweet Peas and Chrysanthemums are such popular flowers, being grown in all gardens in every part of the country, and there is such an infinite variety of types and forms of each, that it has been thought desirable to deal with these three subjects separately, so that fuller details may be given. There is nothing difficult in the cultivation of any one, but much of the success which attends one's efforts depends upon the selection of a suitable type and the correct preparation of the ground.

ROSES

The number of named varieties of Roses is increasing at a very rapid rate and there are to-day well over 12,000 distinct kinds grown. In all there are nineteen different classes of Rose, and in some instances these classes are sub-divided; it may be expected, therefore, that a suitable type and kind may be secured for all and every purpose. Besides there being numerous classes there is also a number of different forms of tree. Roses may be obtained as bushes, standards, half-standards, weeping standards, pillars and climbers; in other words, there is a form eminently suitable for every part of the garden. The last mentioned have already been dealt with (Chapter IV), as these are employed chiefly for covering unsightly walls or making a screen between sections of the garden ; hence they need not be referred to here, excepting in connexion with the questions of planting, manuring and pruning.

The chief types of Roses are as follows :

The Provence or Cabbage : The flowers are almost globular in shape and are sweetly scented ; one of the best of the garden Roses, although not so refined, perhaps, as some of more modern creations.

The Damask : This old type is very hardy, free-flowering and fragrant and is well suited to town gardens.

The French : This is a very suitable type, easy to manage, hardy and richly perfumed and has been used largely for hybridising ; it requires an abundance of air and sun and is, therefore, not suited to the town.

The China : This blooms almost perpetually and is a general favourite ; best suited to a warm corner facing south, as it is not a very strong grower ; the dwarf varieties are excellent for pot culture.

The Bourbon : One of the earliest Roses to bloom and flowers can often be picked long after other kinds have ceased bearing ; it is of strong growth and delightfully fragrant ; a sheltered position should be selected.

The Hybrid China : Only flowers in June and July, but is nevertheless a splendid type for the town garden, as it is a strong grower.

The Hybrid Bourbon : The flowers are very large, brightly coloured and particularly fragrant, although they only appear in June and July ; one of the best types for the town gardener, especially when grown as standards, half-standards and bushes.

The Tea : The most exquisite of all the many Roses, but quite unsuitable for growing in the dirty air of the town ; free-flowering, blooming well into the autumn ; require a little protection in exposed districts in winter, as they are not very robust.

The Musk : The flowers are only produced from August to October, but at this time the huge clusters of blooms with their delicious perfume add a magnificent splash of colour as the summer is waning ; best grown against a south or south-west wall.

The Noisette : Particularly useful for pillars, either in the open or under glass ; the flowers are beautiful in appearance and well scented.

The Hybrid Perpetual : This type is well worth growing, although it has been superseded to a certain extent by the Hybrid Tea ; hardy, free-flowering, pure and varied in colour, and the majority sweetly scented. Best grown as standards, half-standards or bushes in the open, but specially useful for pot culture.

The Hybrid Tea : This is undoubtedly one of the finest types in cultivation ; unsurpassed for beauty for autumn flowering whether grown as a standard, half-standard, bush or climber in the open or in pots. It is hardier than the Tea, but slightly less hardy than the Hybrid Perpetual.

The Austrian Briar : The best type of single Rose ; the blooms are in rich shades of yellow and bronze ; hardy and thrives upon a comparatively poor soil ; no pruning is necessary as the flowers are carried on the tips of the branches.

The Pernetiana : A cross between the Austrian Briar and the Hybrid Perpetual ; vigorous in growth, hardy ; the flowers are fragrant.

The Polyantha Rose: The dwarf varieties make delightful edging plants and are specially recommended for the front of the Rose bed; the climbing varieties are very popular and are excellent for pillars.

The Wichuraiana: Suited to any kind of soil this type produces a wealth of flowers in late summer when trained on a sunny wall or trellis partition.

The Banksian: Good soil and a sunny position are essential; the bright foliage and attractive flowers make a splendid display; rapid in growth; the white variety produces large, fragrant flowers; the yellow variety produces smaller blooms without scent.

The Evergreen: Easy to grow, hardy and requiring but little in the way of pruning this is an excellent type for the small garden; the flowers are borne in immense clusters throughout the summer; predominant colour, white or a pale shade of pink.

The Rugosa or Japanese: Its red and white flowers, its brilliant scarlet hips, and its evergreen foliage render this a valuable type; best suited for growing as a hedge or massing in clumps in some bare corner of the garden; no pruning required.

The climbers most commonly grown belong to the Multiflora and Wichuraiana groups and these are also employed for weeping standards, the climbers being budded on to standard stocks. The majority of present-day Roses recommended for the average garden are classified under the heading of Hybrid Perpetual, Hybrid Tea, Tea, Pernetiana and dwarf Polyantha, but it must be admitted that with so much crossing it is extremely difficult to place some of the modern varieties.

Individual Rose trees and bushes may be placed in the centre of the flower beds, but a better plan, where space permits, is to establish Rose beds or even a Rose garden. Beds filled with standards, half-standards, bushes and fronted either with dwarf Polyantha Roses or with Violas possess a charming appearance, especially if the varieties be selected so that the flowering period is a long one and the colours blend or contrast in a pleasing manner.

The ideal site for Roses is a bed with a slight slope to the south and well protected on the north and east, so that the trees will receive plenty of fresh air and sun and yet be sheltered from the cold north and east winds. If the shelter consist of a belt of trees care should be taken to see that the trees are not too close to the Roses, since they rob the soil of much of its plant food.

A very important factor for successful Rose culture is the proper preparation of the ground. This should be undertaken some weeks in advance of planting; September is, therefore, the best month to commence operations. If the soil be heavy Hybrid Perpetuals, Hybrid Teas and Penzance Briars should be selected; on light soil Teas, Rugosas, dwarf Polyantha and Wichuraianas are more suitable. Any ordinary garden soil can, however, be brought into the right state by the addition of road grit, compost, wood ashes and old mortar if the soil be heavy, and decayed vegetable matter if the soil be light.

The whole site should be trenched. Clinkers and ashes should be mixed with the third spit if the soil be clay, strawy horse manure and a little old mortar rubble added to the second spit and a good dressing of decayed horse manure incorporated with the top spit. An ordinary heavy soil should have strawy manure and old mortar rubble mixed with the second spit and plenty of well decayed horse manure with the top spit. A light, sandy soil requires different treatment. A good dressing of cow and pig manure should be worked into the third spit, so as to render it more retentive of moisture; the second and top spits should be dressed with some heavy loam, from an old pasture if possible, and well rotted cow or pig manure. A chalky soil is of little use for Rose growing. If this subject is to be cultivated the only thing that can be done is to replace the original soil with fibrous loam of a clayey nature, the quality of the blooms depending upon the quantity of soil renewed.

Rose trees may be planted at any time between October and March, if the weather be open, but the sooner the work is done after the beginning of October the better. By planting at this time the natural warmth of the soil is helpful. When the new trees arrive they should be unpacked and if planting is not to be carried out at once they should be "heeled in," that is, the roots should be buried in a trench of soil, but it is advisable to plant them as soon as possible. If the stems appear dry and shrunken the whole tree should be buried in soil for a few days.

The necessary number of holes should be opened to the right depth—standards should be planted only 2-in. to 4-in. below the surface, while bushes should be planted so that the union between the scion and stock is about 1-in. below ground—and the bottoms slightly rounded off. All spent flowers, buds and foliage should be removed; long shoots shortened;

and any damaged portions of the roots cut off cleanly. Any long, thick roots should be cut back to 6-in., but all fibrous roots should be retained. The roots should be spread out evenly and then covered with soil. Firm planting is essential. Before filling in the holes those trees which require staking should have the stakes inserted at this time ; otherwise driving them in afterwards may damage the roots. In cold districts the base of newly-planted trees should be covered with a few inches of burnt soil or cinders for protection during the winter.

Increasing Rose Trees.

Roses may be increased in five different ways. These are from seeds, cuttings, by layering, grafting and budding. The first three methods have been dealt with in Chapter VI, and grafting is discussed in Chapter XIV ; therefore, little further need be said concerning these methods. The seeds must be sown under glass, but this plan is only adopted by growers who are desirous of raising new varieties, since Roses do not come true from seed. When increasing by means of cuttings these should be taken in September or October from shoots of the past summer's growth, with a heel of the old branch, and should be about 12in. long. All foliage, with the exception of one leaf at the top, should be removed and the cuttings inserted to one-half their depth in trenches with a little sand in the bottom. The rooted cuttings may be lifted the following autumn.

Budding is the usual method of increasing Roses. The number of Roses that thrive well on their own roots is limited ; therefore they are usually budded on to special stocks. Hybrid Perpetuals, Hybrid Teas and Pernetianas do best on a Briar-cutting, while Teas are more satisfactory when grown on Seedling Briar stocks. The Briar cuttings and the Seedling Briars should be planted in early spring, but if hedgerow Briars be employed these should be planted in the autumn.

Budding should be done in July and August, although it may be carried out as late as September. The buds are obtained from shoots from which the bloom has recently fallen and are found in the axil of the leaf. Only the lower, plump ones should be chosen. The shoots should be trimmed and cut and only a short piece of the leaf stalk left for handling.

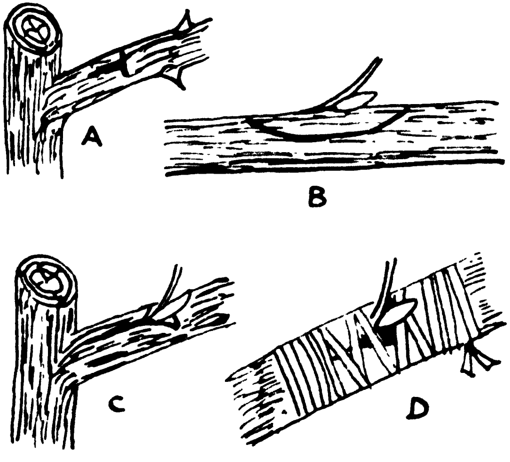

Fig. 15

The thorns should be removed from the laterals of the stock and a T-shaped cut made with the budding knife, as shown at A, Fig. 15, each cut being 1½-in. in length. The bud is then cut off (B, Fig. 15), the wood at the back carefully removed and inserted in the T-shaped cut (C, Fig. 15), and tied with raffia (D, Fig. 15). In the following March the laterals should be cut back just inside the cross cut. Dwarf Roses are budded in the same manner, but below ground, as shown in Fig. 16. The next March the whole of the top growth is cut away just above the bud, the wound being dressed with painters' knotting to seal it and prevent bleeding and the entry of the pith-boring maggot.

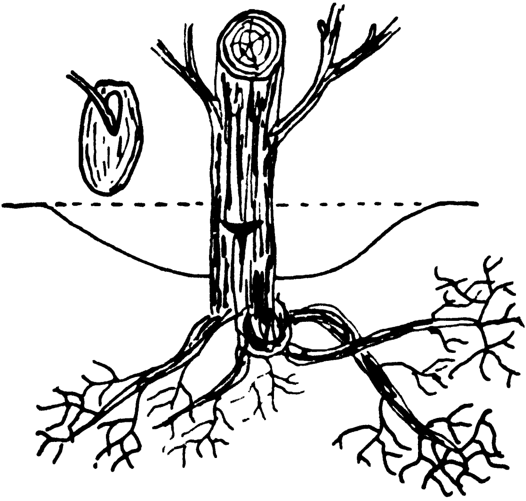

FIG. 16

The Care of Rose Trees and Bushes.

The chief items of work in connexion with Rose-growing are keeping the ground free from weeds by the constant use of the hoe, watering in dry weather, pruning and feeding. Too much stress cannot be laid on the importance of hoeing, since this keeps down the weeds as well as preventing evaporation of soil moisture, since it closes the tiny tubes which form in all unhoed soil and from which the water rapidly passes into the air. The same rule should be followed in connexion with watering Roses as with all other subjects. Sprinklings now and again are of little use ; when the ground is dry, say, after two or three weeks' drought in the case of light soil or three or four weeks with heavier soil, a good soaking should be given.

Pruning is a very important duty, but, unfortunately, in a book of this description it is impossible to deal fully with the exact method that should be followed with each type, since these vary so considerably. The best principal rule to follow in all cases is to cut back the weaker shoots more severely than the stronger. Pruning should be carried out from the middle of March to the middle of April, according to the prevailing weather conditions, so that new growths are only induced to form after all danger of late, severe frosts is over. First of all any dead, thin or useless wood should be removed, leaving only from three to six of the strongest shoots on the bushes for shortening (Fig. 17). When shortening, and this applies to all types of Roses, always make the cut in a slanting direction downwards from a bud which is facing outwards (Fig. 18). Touch up all cuts with painter's knotting. Closer cutting is generally necessary with standards and half-standards, since the shape of the head must be preserved. Moss Roses should be cut back to four or six buds. China Roses should be thinned rather than pruned; Rugosas are usually grown in hedge form; hence need not be

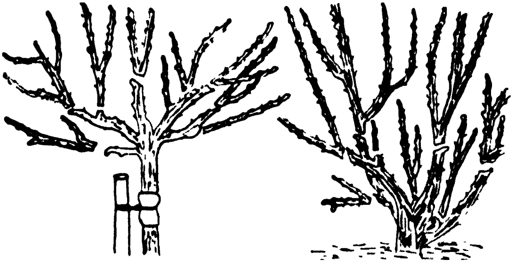

FIG. 17

touched, save to cut out any dead, useless wood. Dwarf Polyanthas should be cut back hard each year when very small plants are

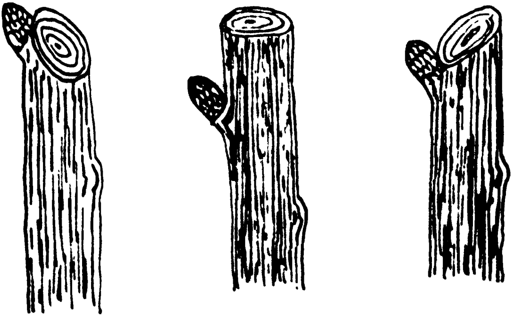

FIG. 18

required; under these conditions they need not be pruned, only the tops of the old flowering shoots being cut off. Climbing Roses do not require pruning, excepting the first year, but if there be sufficient new stems for training all the old ones may be cut out after blooming is over; failing sufficient new growths the strongest of the old stems should have their laterals removed.

Feeding Roses.

It is commonly supposed that it is impossible to overfeed Roses and that they may be treated to very liberal dressings of rich, natural manure. This is not, however, the case and the best advice that can be given to the amateur Rose-grower is when in doubt give less. Feeding is, of course, essential if large, well-formed blooms are to be secured and the flowering period lengthened, but it must be done judiciously.

During the first year after planting the only manure that should be applied is bone meal at the rate of 4-oz. per square yard, this being given during the winter months, as it is a slow acting fertilizer. Later on, when the trees are established, a proper system of feeding must be followed. In the autumn a mixture of basic slag, 4-oz., and kainit, 1½-oz. should be lightly worked into each square yard of soil. In place of this mixture of artificials, however, a good dressing of well-rotted stable manure may be applied in the same manner when this form of plant food can be procured. If the soil be light and artificials are used, these should be applied in the autumn, but when natural manure—preferably cow or pig manure—is available, the best time to dress the ground is the spring.

During the growing period small doses of special fertilizers should be given. For spring and early summer nitrate of soda, ½-oz. per square yard or sulphate of ammonia, 1-oz. per square yard, are excellent, since they promote growth of foliage. In the late spring an application of 2-oz. superphosphates assists in the production of flowers. The quantities suggested refer to the total amount to be used ; therefore, if three applications be made only one-third should be given on each occasion.

When the buds are developing liquid manure and soot water should be used in alternate weeks. These liquids are prepared as described in Chapter III. Weak solutions are preferable to stronger ; the liquids should be the colour of weak tea.

A plan that is frequently adopted by Rose-growers is to use a special mixture of artificials in the early spring—in February or early March—this being sufficient for the whole twelve months. A very valuable mixture is that known as Tonks', this consisting of superphosphates, 12 parts by weight ; nitrate of potash, 10 parts ; sulphate of lime, 8 parts ; sulphate of magnesia, 2 parts ; and sulphate of iron, 1 part. Three ounces of this mixture should be applied per square yard.

A Selected List of Varieties.

Considering that there is such a vast number of named varieties of Roses it is extremely difficult to recommend any special kinds for the amateur's garden. A small number is suggested as being particularly useful for the novice Rose-grower, but it must be understood that there are hundreds of other sorts which are equally good. The best climbing varieties for arches and pergolas have already been mentioned ; the following—arranged according to type—will be found easy to grow and free-flowering, while the majority are fragrant.

SCENTED ROSES

Cabbage or Provence, in white, pale pink and rose-pink ; Tea, Alexander Hill Gray (lemon-yellow), Gloire de Dijon (yellow, shaded pink) Madam Hoste (yellow), Marie Van Houtte (white, yellow and rose), Mrs. Edward Mawley (pink and yellow). Hybrid Tea—Augustine Guinncisseau (white and rose), Dr. O'Donel, Browne (carmine-rose), Johanna Sebus (rosy-cerise), Richmond (crimson), Dorothy Page Roberts (coppery-pink), Duchess of Wellington (saffron-yellow). Hybrid Perpetual—Alfred Colomb (red), General Jacqueminot (scarlet), Hugh Dickson (crimson), Mrs. John Laing (pink), Ulrich Brunner (cerise-red), Commandant Felix Faure (crimson). Hybrid Bourbon—Madame Isaac Periere (rosy-carmine), Charles Lawson (vivid carmine), Paul Ricault (crimson), Coupe d'Hebe (pink).

STANDARD ROSES

Caroline Testout (pink), Hugh Dickson (crimson), White Maman Cochet (white), Joseph Hill (coppery-yellow and salmon-pink), Lady Ashtown (deep pink), La Tosca (creamy-rose), Madame Ravary (orange-yellow), Madame Antoine Narie (rose and white), Killarney (pale pink).

NORTH AND EAST WALL ROSES

Bennett's Seedling (white), Rene Andre (yellow and orange-red), Gloire de Dijon (yellow and pink), Ruby Queen (carmine and white), Gerbe Rose (pink), Felicite et Perpetue (white), Ards Rover (crimson), Bouquet d'Or (yellow), Climbing Caroline Testout (pink), Biliard et Barre (golden-brown), Madame Alfred Carriere (white).

SOUTH AND WEST WALL ROSES

Longworth Rambler (crimson), Reve d'Or (yellow), climbing Mrs. Grant (pink), Francois Crousse (crimson), Madame Jules Gravereaux (flesh and yellow), climbing Aimee Vibert (white), W. A. Richardson (orange-yellow), Zephirine Drouhin (carmine), Reine Olga de Wurtemburg (rose-crimson), Gustave Regis (yellow).

TOWN GARDEN ROSES

Gloire de Dijon (yellow and pink), Caroline Testout (pink), Hugh Dickson (crimson), La Tosca (creamy-rose), Madame Abel Chatenay (rose, carmine and salmon), Madame Ravary (orange yellow), Madame Isaac Periere (rosy-carmine), Mrs. John Laing (pink), Mrs. Paul (creamy-white), Ulrich Brunner (cerise-red), Dr. O'Donel Browne (carmine-rose).

The Cultivation of Pot Roses.

Given a minimum winter night temperature of between 50 degrees and 55 degrees Roses may be had in bloom throughout the whole of the year. If a frost-proof house only be available, one with a winter night minimum temperature of 40 degrees to 45 degrees, the flowering period can be considerably prolonged.

The best compost for pot Roses is one consisting of decayed turfy loam, 2 parts, and old manure 1 part. These should be well broken up and thoroughly mixed, sufficient sand being added to keep the whole porous and open, and a 5-in. pot full of bone meal added to each barrowload of the soil. The Roses may be raised at home, but this requires a considerable amount of skill and, therefore, the amateur is advised to purchase pot plants which have been specially grown for forcing under glass. If this be done the bought plants should be shifted into 8-in. pots in early October, a few lumps of charcoal being placed on top of the crocks at the bottom for drainage purposes. The plants should be potted firmly to within half an inch of the rim.

A month later the plants should be hard pruned and afterwards for a few weeks only a very little water should be given ; plenty of ventilation is, however, necessary on sunny days. No heat should be applied until December when the growths are beginning to develop. As the buds form syringing in sunny weather in the morning with tepid water will induce them to break, while at the same time a little fertilizer —special Rose manure should be employed— at the rate of ½-oz. to the gallon of water should be given after watering with clear water every second week.

It is quite possible to secure as many as three crops of flowers, but on no account should the last be later than the end of June. At this time the plants should be taken out of doors and placed in a sunny corner of the garden. This will allow the wood to ripen, so that all will be in readiness in the following October for forcing again.

The cultivation of pot Roses is rather different when only a frost-proof house is to be used. The plants should be potted in October as suggested previously, plunged directly to their rims in ashes in the open, where they should remain until February. They should then be removed to the frost-proof house, pruned hard, liberally watered at first, but later until they are growing well water should only be sparingly given. Ventilation is essential, but the windows or ventilators should be closed early in the afternoon, as this will make the night temperature higher.

Climbing Roses are excellent for the greenhouse. They may either be planted in a bed in the greenhouse or the roots may be planted outside and the stems brought through the wall of the house

Some of the best pot Roses are as follows: Molly Sharman Crawford, Tea, white; Nenrietta, Hybrid Tea, shades of orange; Covent Garden, Hybrid Tea, dark red; Liberty, Hybrid Tea, light red; Richmond, Hybrid Tea, light red; Chas. E. Shea, Hybrid Tea, pink; Lady Pirrie, Hybrid Tea, pink; Una Wallace, Hybrid Tea, pink. Excellent climbing Roses for growing under glass are: Climbing Caroline Testout, Climbing Lady Ashtown, Climbing Mrs. W. J. Grant, Climbing Niphetos, Climbing Paul Lede, Climbing Marechal Niel, Climbing W. A. Richardson.

SWEET PEAS

Sweet Peas are very easy to grow, provided three points be remembered. These are that they are deep-rooting and, therefore, deep cultivation is necessary; their roots are provided with nitrogen gathering nodules, so nitrogenous manures are not required; and they require supporting. They bloom for many months, bear flowers in profusion in an infinite variety of colours, while the blooms are suitable both for garden decoration and for cutting.

When planted in large clumps, either in special beds, with a double row or Violas in the foreground, or employed in the herbaceous border they make a delightful feature in any garden. To secure the most attractive display each clump should consist of flowers of the same colour, although the different clumps may possess blending or contrasting colours, while the amateur is more likely to succeed if he selects self-coloured varieties in favour of the Fancies, although some of the last mentioned are charming.

As a deep-rooting subject the site should be well prepared. The ground should be trenched, either animal manure or a hop substitute being worked into the third spit. Next should come a three inch layer of soil, but with the next nine inches of the second spit a good sprinkling of steamed bone flour and superphosphates should be given to each spadeful of earth, the idea being that the artificials do not come into direct contact with the natural manure in the third spit. The top spit of soil should be returned as it is without the addition of any fertilizer. Whenever possible this work should be taken in hand in the autumn, since it always pays to prepare the site some time in advance. When the Sweet Peas are grown in a special bed this can be arranged easily; when grown in the herbaceous border the work should be carried out in the spring. Before planting the Sweet Peas in the spring the surface of the soil should be lightly forked over and a good sprinkling of lime and soot, in equal parts, applied; the former is essential for successful culture of this subject; the latter acts not only as a plant food, but also kills or otherwise prevents slugs and other pests making their appearance in the soil.

When the Seed should be Sown.

The best results are undoubtedly achieved when the seed is sown in boxes in September, since the plants are well advanced before the winter and the blooming period is not only brought forward, but in duration it is longer. Before winter arrives the seed boxes should be placed into frames, so that they will pass through the cold weather without injury. In some very mild districts it is possible to sow the seed in the open, staking the immature plants with twigs as a means of support for the next few months.

If for any reason one decides not to sow in the autumn the first sowing should be made under glass in the middle of January. A succession of sowings should follow at three weeks' intervals until the middle of March. Either seed boxes or the special cardboard cartons should be used. Failing both an autumn sowing and an early sowing under glass the seeds may be sown in the open from the middle of March to the middle of April.

There is a considerable difference in the hardness of the seeds. The softer seeded varieties, those light or white in colour, may be sown without further attention, but in the case of dark or greyish varieties the seed should be clipped; that is, the outer skin should be pierced with a knife or file, but great care should be taken to prevent injuring the germ.

A comparatively poor soil is best for seedling Sweet Peas. An excellent compost to employ can be prepared by using fibrous loam, 3 parts, leaf mould, 1 part and a little silver sand, but if any soil can be procured from the vegetable garden after the early potatoes have been lifted this will be found the best of all. The seeds should be covered with about half an inch of soil, but the best way of sowing is to force each seed into the soil to the proper depth by means of the finger or a lead pencil. When sowing under glass the seed boxes or cartons should be covered with a sheet of glass and then a sheet of brown paper, as this not only hastens germination, but also encourages strong root development. The paper should be removed as soon as top growth is visible.

To obtain strong, sturdy plants the seedlings must be given an abundance of light and air. When autumn sowing is practised the top of the young plants should be pinched out as soon as two pairs of leaves have been formed; this causes new growths to rise from the joints below. If the pinched out tops be two or three inches in length they may be struck as cuttings.

To prevent the plants becoming spindly the autumn sown plants in the cold frames must be well ventilated in mild weather during the winter; in fact the frames should only be closed at a time of severe frost. The early spring sown plants—those raised under glass—must be hardened off in the usual manner before they are planted out.

Planting out should be done towards the end of March or early in April, provided the conditions are suitable. The soil should be shaken off the roots and each one planted singly, unless the soil be heavy, in which case it is better to plant a whole carton full without disturbing the roots. The holes should be made with a trowel, the roots carefully dropped in and the hole filled and finally compressed. Plant 6-in. apart unless exhibition blooms be wanted, in which case allow 9-in. between the plants.

When the flowers are required for garden decoration the plants need not be restricted as regards the number of stems, but when large, exhibition blooms are wanted the plants should be reduced to one, two or three stems according to the variety grown. The grower is strongly advised to adhere to the suggestions made later in this connexion, since if too many stems be allowed to develop the flowers will be small in size, while if restricted to too great an extent the blooms are likely to be coarse in texture. When exhibition blooms are needed all laterals should be removed, the lower entirely, the upper with a single pair of leaves remaining.

Feeding Sweet Peas.

If the plants be grown for decorative purpose solely and the site has been properly prepared in the autumn or very early in spring no feeding is necessary. A little stimulant may, however, be given to the exhibition plants, this being applied about three weeks before the flowers are wanted. In this case, a special Sweet Pea manure should be employed and only used in moderation. All plants may, however, be given an occasional watering with soot water, since this has a remarkable effect in imparting a richness to the colour which is not attainable in any other way.

Supporting Sweet Peas.

If the plants be grown in clumps the best method of supporting them is by means of twiggy rods, as these are quickly covered and are not, therefore, unsightly. If the plants be grown in rows for cutting purposes—the rows should always be from north to south so that all plants receive their fair share of the sun—big mesh netting may be used or strong twine stretched between stout uprights will answer the purpose.

Easy Varieties to Grow.

When garden decoration and cutting are the main objects in view the following will be found exceptionally useful varieties: R. F. Fulton, Edna May Improved, Annie Ireland, Jean Ireland, Picture, Royal Scot, Charity, Mrs. Tom Jones, Royal Purple, Cecily, W. J. Unwin and Doris. These are all sun-proof varieties and do not require shading.

For exhibition purposes the following sun-proof varieties are recommended. Picture, two stems, deep cream-pink, a very vigorous grower; Royal Scot, two stems, scarlet-cerise; W. J. Unwin, two stems, cream-salmon-pink, particularly recommended for the amateur; Charity, two stems, crimson; Matchless, two stems, cream; Improved Faerie Queen, one stem, pink suffused over a cream ground; Annie Ireland, three stems, white edged with rose.

Under Glass.

When ordinary varieties of Sweet Peas, such as Valentine, Comrade, Powerscourt, Tangerine Improved, Wizard, Melba and George Shawyer, are to be grown under glass the seed should be sown in September and the seedlings kept hardy. When 4-in. to 5-in. high the lead should be pinched out and the plants may then be inserted in the greenhouse bed in January or February, supports being put in at the same time. Ventilation is essential whenever the weather allows.

For many reasons, however, the amateur is advised to select Cupid Sweet Peas for growing under glass, especially for his initial attempt. They flower some time in advance of those grown in the open and provide an abundance of blooms during the early months of the year. The seed is best sown in July and September, six seeds being placed into each 8-in. pot. No transplanting is necessary. The flowers will remain fresh for a couple of weeks after cutting, while they possess a stronger perfume than the ordinary varieties. Good varieties for the amateur are as follows: Melrose, cerise Cantab blue ; Father Christmas, white ; Yuletide, orange-pink ; Santa Claus, lavender ; and Trentina, pink on a white ground.

CHRYSANTHEMUMS

The two main groups of Chrysanthemums are the early-flowering or outdoor varieties and the late-flowering or indoor sorts. These two main groups are, however, divided into a number of separate classes, the chief being the Incurved, Japanese Incurved, Japanese Decorative, Anemone-flowered, Pompom and Single-flowered. There is a very large number of named varieties in each group, some of the blooms reaching a diameter of 10-in.

Increasing Chrysanthemums.

It is possible to raise Chrysanthemums from seeds, but a better method of propagating them, especially those belonging to the late-flowering groups, is by means of cuttings, while many outdoor varieties may be increased by division. For growing under glass the cuttings may be struck at any time between November and April, the cuttings being taken from the new shoots which spring up round the base of the old plants (Fig. 19). An ideal cutting is one some 2½-in. in length after it has been cut immediately below a joint. The old plants are sometimes chary at sending up new shoots, but this can be overcome by applying a top-dressing of sifted loam and sweet leaf mould in equal proportions to a depth of half an inch.

The cuttings struck between November and February usually take about five weeks to root; those struck later about three weeks.

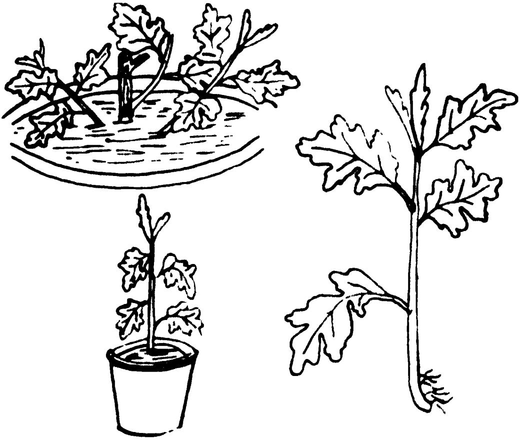

Fig. 19

The best compost to use is soil from an old pasture, but a mixture of three parts of pasture soil, one part leaf mould, and half a part of crushed mortar or very coarse sand, together with a sprinkling of ashes and bone meal answers the purpose admirably. As with all cuttings, a thin layer of fine sand should be strewn over the surface of the compost. Four cuttings should be inserted round the edge of each 3-in. pot and the pots placed into the propagating case until rooted, while the greenhouse should maintain a minimum temperature of 50 degrees. For the first ten days the case should be kept closed, but the glass should be removed daily and any moisture that has collected on the underside wiped off; later more air may be admitted, while at the end of three weeks the pots may be placed on a shelf near the glass.

A succession of blooms should be aimed for and to this end cuttings should be struck every two or three weeks. When the cuttings are well rooted they must be repotted, in this case one plant being placed into each 3-in. pot in a compost consisting of the same ingredients as used for the cuttings. Placed on a shelf near the glass and watered with a rose, kept at a temperature of 50 degrees, and given plenty of ventilation on suitable days, the plants will develop rapidly.

When the pots are filled with roots--this will be about the end of March with the November and early December cuttings, and later with those that follow—the plants should be repotted for a second time. Each cutting should be inserted singly into a 5-in. pot in a compost of three parts loam, one part each leaf mould, and well-rotted manure, one-eighth part lime rubble, and a sprinkling of sand, wood ashes and bone meal. The cuttings must be planted firmly, watered carefully and gradually hardened off by giving more air. The plants should be staked at the time of this second repotting.

The earliest cuttings will be due for their final repotting in June. A useful compost consists of four parts loam, one part old horse manure, half part leaf mould, half part mortar rubble, half part wood ashes and half part crushed charcoal, while to each bushel of the compost half gallon of bonemeal and 2-lb. of some Chrysanthemum fertilizer should be added. The pots should be either 8-in. or 10-in. With the cuttings that are struck later the same treatment is necessary, but is naturally done rather later than the times stated.

The Growing Stage.

After the final repotting the plants should be placed into their summer quarters in the open. The site selected should be well sheltered, but open. Planks of wood or slates should be placed on the ground running north and south, the pots placed thereon and supported. To support, a stout post should be driven into the ground at the end of each row and two wires stretched from end to end, one 3-ft. and the other 4½-ft. from the ground. This prevents the pots being blown over in windy weather. The shoots should be tied in frequently during the summer, since growth is rapid.

Feeding may begin at the end of August, as the pots will be full of roots. Three applications of soot water and very weak liquid manure should be given weekly, using them alternately, while after three weeks the manure may be rather stronger—the usual colour of weak tea—and alternated with a dissolved Chrysanthemum fertilizer. Half an inch of rich soil should also be added to each pot.

Stopping Chrysanthemums.

Stopping, or pinching out the tops of the plants to induce bushy growth, is necessary with all Chrysanthemums. In some cases this must be done twice; in others once is sufficient. In the former case stopping should be done at the beginning of April and again in June; in the latter from the middle of April to the middle of May.

In addition to stopping all shoots that appear the buds must be removed, while all but one bud should be rubbed off, excepting with those varieties where the flowers are produced in sprays. The spray-flowered varieties should be stopped first when the shoot is 6-in. long and again when the new shoots are the same length.

Single-flowered varieties require slightly different treatment. Instead of placing the cuttings in singly at the time of the final potting three or four should be put into each 8-in. or 10-in. pot. The spray varieties do not, of course, require stopping ; other sorts must be stopped in June and disbudded some time in August.

Wintering under Glass.

At the end of September or very early in October, according to the weather conditions, the plants should be brought under glass, but on no account should any artificial heat be provided for a couple of weeks. After this lapse of time a minimum temperature of 50 degrees should be maintained, this being increased by 5 degrees when the buds begin to open. Plenty of room must be afforded the plants and in all but foggy weather the house must be well ventilated. Watering should be carried out sparingly. No feeding is required when the buds are half open and onwards, but until this time the plants should be fed as already directed.

Outdoor Chrysanthemums.

The ground should be prepared for the outdoor Chrysanthemums during the winter. It should be trenched and a little old manure, wood ashes and lime added. The site should be raked over in April to produce a fine tilth so that the ground will have settled before planting out in May.

When the early-flowering class is being propagated by means of cuttings the old plants should be taken into the greenhouse in January. The cuttings should be struck in the manner already outlined and planted out into the prepared site, after hardening off, in May.

Many of the best outdoor sorts are grown in sprays and, therefore, do not require stopping; others, however, must be stopped, this taking place towards the end of May. With stopped varieties the first buds that appear should be removed. The flowering period is from August to November.

The hardy kinds may well be wintered out of doors, but those of a more delicate nature should be lifted as soon as the last flowers have been borne, placed into boxes and kept in a cold frame until the spring, when they may be replanted, unless previous to this they have been taken into the greenhouse for the production of suitable shoots for cuttings.

A Selection of the Best Varieties.

There is a very large number of exquisite varieties from which a selection may be made; it is extremely difficult, therefore, to choose a limited number for special recommendation. Those mentioned in the following lists, however, will prove suitable for the amateur grower:

OUTDOOR CHRYSANTHEMUMS.

Name.	*Colour.*	*Flowering period.*	*Disbud or Sprays*
Almirante	Red, shaded scarlet	September	Disbud
Agnes	Salmon	September	Sprays
Abercorn Beauty	Deep bronze	August	Disbud
Carrie	Canary yellow	August	Sprays
Collet Harris	Pink	September	Sprays
Debutante	White	September	Disbud
Diana	Crimson and gold	September	Sprays
Dick Barnes	Crimson	September	Disbud
Elstob Yellow	Yellow	September	Sprays
Harry Thorpe	Orange yellow	August	Disbud
Jimmie	Purple	October	Disbud
Le Pactole	Bronze yellow	October	Sprays
Nina Blick	Reddish bronze	August	Sprays
Stella	Blush pink	September	Disbud
Tonkin	Bright orange	September	Sprays

OUTDOOR SINGLE CHRYSANTHEMUMS.

Name	*Colour*	*Flowering period*	*Disbud or Sprays*
Bronze Queen	Bronze, shaded amber	August	Sprays
Chieftain	Deep crimson	September	Disbud
Formidable	Clear pink	September	Disbud
Golden Oriole	Sulphur yellow	September	Disbud
Glorious	Crimson	August	Sprays
Salmonea	Rich salmon	September	Sprays
Sunstar	Chestnut gold	September	Disbud
Shrapnel	Terra-cotta	August	Sprays

INCURVED CHRYSANTHEMUMS.

Name	*Colour*	*When to Stop*	*Buds to take and date*		
					August
Buttercup	Deep yellow	May 20	1st	crown	25th
Buff King	Silvery buff	March 30, June 1	2nd	,,	25th
Calypso	Reddish bronze	May 30	1st	,,	30th
Clara Wells	Golden ochre	March 30, June 1	2nd	,,	30th
Duchess of Fife	Blush white	March 30, June 5	2nd	,,	30th
Frank Tristan	Amber	March 30, June 5	2nd	,,	30th
Golden Glory	Deep gold	June 1	1st	,,	30th
H. W. Thorpe	White	March 30, June 5	2nd	,,	30th
Ialene	Rosy lilac	May 30	1st	,,	25th
Miss C. Stoop	Mauve	May 30	1st	,,	30th
Mrs. B. Hankey	Mahogany crimson	June 1	1st	,,	25th
Mrs. H. J. Jones	Soft rose	April 5	1st	,,	20th
Silver King	Silvery rose	May 30	1st	,,	20th

JAPANESE CHRYSANTHEMUMS.

Name	*Colour*	*When to Stop*	*Buds to take and da*		
					August.
A. F. Tofield	Chestnut red	May 1	1st	crown	7th
Dr. J. M Inglis	Purple	May 30	1st	,,	18th
Edith Cavell	Orange bronze	April 1, June 1	2nd	,,	20th
General Petain	Flesh pink	April 15	1st	,,	15th
Helmuth	Rich crimson	May 15	1st	,,	18th
Majestic	Golden amber	April 15	1st	,,	15th
Mrs. B. Carpenter	Old rose	April 1, June 1	2nd	,,	20th
Mrs. C. Davis	White	April 15	1st	,,	15th
Mrs. T. J Fleming	Lilac and white	April 12	1st	,,	12th
Mrs. J. Balmer	Indian red	May 30	1st	,,	20th
Princess Mary	Rich yellow	April 15	1st	,,	10th
Queen Mary	White	April 15	1st	,,	10th
Sir E. Letchworth	Rosy purple	April 1, June 1	2nd	,,	25th
Wm. Ve	Crimson	April 20	1st	,,	18th

DECORATIVE CHRYSANTHEMUMS.

Name	*Colour*	*Flowering Period*	*Disbud or Sprays*
Anthea	Pink	October	Disbud
Batchelor's White	Pure white	November	Disbud
Chestnut White	White	December, January	Disbud
December Bronze	Bronze	December	Disbud
Evelyn Baldock	Crimson and gold	December	Disbud
Lovely	Flesh pink	November	Sprays
Market Red	Crimson	November	Sprays
Mrs. J. Thompson	Yellow	December, January	Disbud
Madame Oberthur	White	December, January	Disbud
Nagoya	Golden	December, January	Sprays
Pink Favourite	Shell pink	December	Disbud
Sunshine	Golden amber	November	Disbud
Teresa	Bronze apricot	December, January	Disbud
Western King	White	December, January	Sprays

LATE-FLOWERING SINGLE CHRYSANTHEMUMS.

Name	*Colour*	*Disbud or Sprays*
Aviator	Bright red	Disbud
Bertha Fair	Orange flushed bronze	Disbud
Barbara	Bright red	Sprays
Ceddie Mason	Rich crimson	Sprays
Edith Dimond	Yellow and bronze	Disbud
Evelyn	Chestnut scarlet	Sprays
Glitter	Gold and amber	Disbud
Joyce Strowlger	Deep pink	Sprays
Lady Mowbray	Buttercup yellow	Sprays
Lizzie Robertson	Bright yellow	Disbud
Mary Morris	Terra-cotta	Sprays
Mildred	Rose pink	Disbud
Miranda	Apricot bronze	Disbud
Miss Goodburn	Crimson lake	Sprays
Miss Mary Pope	Shell pink	Sprays
Mrs. J. B. Minchin	Golden apricot	Disbud
Mrs. W. J. Godfrey	Peach pink	Disbud
Optimist	Bronze and yellow	Disbud
Portia	Terra-cotta	Disbud
Queen Alexandra	Mauve pink	Sprays
Stella	Pure white	Sprays
Sweet Auburn	Rich orange	Disbud
White Beauty	White	Sprays

CHAPTER IX

BULBOUS PLANTS AND THEIR CULTIVATION

THE amateur gardener should not confine his thoughts entirely to the cultivation of such bulbous plants as Hyacinths, Daffodils, Narcissi, Tulips, Crocuses and Snowdrops. There is a vast number of other sorts which well repay cultivation and, being easy to grow, there is no reason why some of them, at any rate, should not be selected. It is thought desirable therefore, to deal fairly fully with the special needs of this class of plant.

The use of most garden plants is restricted, but this is not the case with bulbs. They may be planted in all parts of the garden, to say nothing of the greenhouse and the dwelling-house, and it is not altogether an easy matter to determine which is the best. A formal bulb garden, when space permits, gives a most striking effect with its riot of glorious colour; for spring bedding and in the herbaceous border their early flowers are just what are most required; a combination of bulbs and shrubs makes a wonderful feature, especially when small evergreen or variegated foliaged shrubs are used as " dot " plants to relieve the flatness of the formal bulb bed; for the decoration of window boxes; for the rock garden where they contribute largely to the early effect; and for naturalizing in grass bulbs may be employed.

For indoor cultivation, whether it be in the greenhouse, conservatory or living-room, there is no subject that gives such a succession of beautiful flowers throughout the dark, dreary days of winter. Their cultivation under glass is easy in the extreme and it is next to impossible to fail. They may be grown in a variety of mediums, such as water, fibre, shingle and soil—nothing comes amiss to them.

Increasing Bulbs.

It is possible to increase the majority of bulbous plants in this country, but the amateur gardener is advised to buy a collection each season to supplement those which he is able to hold over from the previous year. When buying bulbs it is important to select kinds and varieties which are suitable for the conditions under which they are to be grown. The guiding factors are the size of the garden and the nature of the soil. Some bulbs, of course, such as the Narcissus, will grow in almost any soil, but some of the more delicate sorts are more particular. A light loam where leaf mould and sand are present, where moisture is retained and where the drainage is good suits the vast majority of bulbs. Partial shade is preferable, but this does not mean that they should only be planted underneath trees, but that they should be shaded during the height of the day. If possible a sample of the bulbs should be examined. The bulbs should be of medium size, firm to the touch, show no signs of growth and be free from disease and the ravages of insect pests. Both early and late flowering varieties should be selected, so that a prolonged blooming season may be secured. For instance, in the case of Daffodils the first to flower are the Polyanthus varieties, these being followed by the Trumpet kinds and these again by the Narcissus poeticus. Roman and Italian Hyacinths are early bloomers, being followed by numerous other kinds. On no account should a mixed lot of bulbs be purchased. These are offered at a very low price, but are generally very poor in quality. A smaller number of more expensive bulbs will always give a better display.

The term bulb is rather loosely used at the present time, since included in it are all those subjects with the kind of underground stem, such as seen with the Hyacinth, Tulip and White Lily, together with the Crocus, Dahlia and Gladiolus. The structure of the root varies, being in the form of a bulb, corm, rhizome or tuber. They are all the same, however, in that they store food in their underground parts for the development of the flowering axis.

True bulbs are propagated by offsets or miniature bulbs that are formed by the mother bulbs. Corms, such as in the case of Crocus and Gladiolus, increase in a different manner. The old corm shrinks as its food supply is used up and at the base of the flower shoot a new corm is formed by the thickening of the material between the lower leaves. The old corm dies, the new one grows above to take its place.

A number of bulbous plants may be increased from seed. For those who possess the necessary time this is a fascinating practice, since there is always a possibility that a new variety is grown, for the reason that all bulbous plants do not come true to type when raised in this way. Gladioli lend themselves to this method of propagation; the seeds should be dibbled into a mixture of loam, leaf mould and sand in 5-in. pots or shallow boxes, the seeds being placed 1-in. apart and ½-in. deep in February at a temperature of 60 degrees ; after hardening off the plants may be kept in the open during the summer, brought into the greenhouse for the winter ; repotting takes place at the end of twelve months or the plants may be placed in the open in late spring. Tuberous Begonia, Freesia and Dahlia may also be raised successfully in the same way. Tuberous Begonia seed should be sown in July in finely sifted loam and sand, kept at an even temperature of 65 degrees and the seedlings lifted as they appear—germination is always very erratic—and pricked off singly into thumb pots. Repot as necessary, finally into 6-in. pots in rich, loamy soil for flowering. Freesia seeds are best sown in January at 55 degrees in well decayed leaf mould and sandy loam, putting six seeds into each 6-in. pot ; the young plants will flower in the August following.

Some bulbous plants, such as the Dahlia, can be propagated by means of cuttings. The old roots should be placed in soil in a warm greenhouse in February and the young shoots which arise taken off as cuttings. Placed into sandy soil and covered with a hand light or placed into a propagating case roots will quickly form. When rooted the cuttings should be potted singly, hardened off and planted out into the open in June.

Growing Bulbous Plants in the Open.

It is generally better to allow the bulbs to remain in the ground for a few years without disturbing them, and this should be done whenever possible. The site for them should be trenched and given a good dressing of well decayed manure for a few weeks before planting. If the soil be heavy an application of 7½-oz. of basic slag per square yard should be made at planting time; on light soil it is better to use 2-oz. of crushed bones per square yard.

Much of the success of bulb-growing depends upon the depth to which the bulbs are inserted. A general rule to follow, when no exact knowledge is available, is to plant at twice the depth of the bulbs in question, but there are exceptions to this rule, as the following table shows:

Depth.		*Bulbs.*
1-in	..	Lily-of-the-Valley.
1½ to 2-in	..	Scilla
2 to 3-in.	..	Muscari, Snowdrop, Crocus.
3-in.	..	Chionodoxa.
3 to 4-in.	..	Gladiolus, Narcissus (early), Tulip (early).
4 to 6-in.	..	Narcissus (large-flowering), Tulip (large-flowering), Gladiolus (large-flowering), Lilies.
6-in.	..	Hyacinth.
6 to 7-in.	..	Hyacinth (extra large), Narcissus (extra large).

The early-flowering bulbs should be planted early in the autumn; the time of planting does not influence the flowering period, excepting that if too late no flowers will be produced. The best time for planting each subject is given later. In districts which are subjected to a heavy rainfall the bulbs should be protected by placing a 2-in. heap of leaves with a sprinkling of soil atop of each lot.

Feeding Bulbous Plants.

Chemical fertilizers are hardly necessary for this class of plant. Each bulb can only produce the number of flowers for which it possesses dormant buds, but a top-dressing of some suitable manure does help materially in improving both size and colour. A dressing of

3-oz. of steamed bone flour per square yard in November is generally all that is required in a newly planted bulb bed. For those which are allowed to remain in the ground year after year a little patent bulb manure may be applied in January, or a composite manure consisting of equal parts of superphosphates, bone meal and sulphate of potash may be mixed at home and applied late in January at the rate of 4-oz. per square yard.

Storing Bulbs after Flowering.

The bulbs planted in the herbaceous border must, perforce, be lifted after flowering. They should be raised carefully with their foliage and roots and planted in rows in some odd corner of the garden and well watered if the ground be dry. When the foliage has died down the bulbs should be lifted, dried a little and stored under cover in a bulb tray until required the following autumn for replanting. Bulbs which have not given a good account of themselves should be naturalized.

The summer-flowering bulbous plants, such as Gladiolus and Dahlia, should be planted out in April and May, the site being dug to a depth of 2-ft. and enriched with a good dressing of manure from an old hotbed or mushroom bed for Gladioli and half-decayed manure for Dahlias; a little bone meal should be added a week or ten days before planting.

Naturalizing Bulbs.

Many bulbs do not give of their best when planted in formal beds; their true surroundings are the wild garden, woods and grass land. What effect could be finer than a number of the smaller bulbs of the same kind and colour planted in some out-of-the-way spot under natural conditions? The orchard lends itself splendidly for naturalizing bulbs.

No bulb, unless diseased, should ever be thrown away if it be at all possible to find a location for it. Every season the amateur gardener finds himself with bulbs from the beds and borders and from the greenhouse or dwelling-house. These may not be good enough for planting again under the same conditions; they can, however, be naturalized. When naturalized the bulbs increase more rapidly and flower more freely than those which are planted in the beds and borders; the display each year becomes finer. If an orchard be available what could delight the eye more than clumps of blue Scillas, white Snowdrops, snake-like Fritillarias and blue Chionodoxas carpeting the grass under the blossom-laden fruit trees in spring?

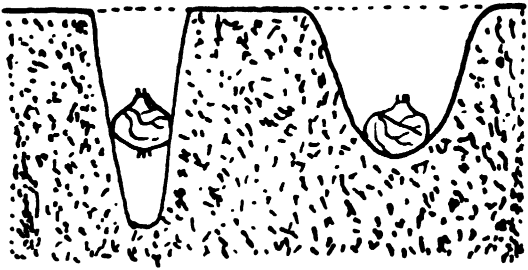

FIG 20

Naturalizing is a simple process. The bulbs should be taken in the hand and thrown down on to the ground and planted where they fall, since any sign of formality must be avoided.

For planting a proper bulb-planter may be used, but it is quite possible to do the work successfully with a dibber, provided care be taken to see that each bulb lies right at the bottom of the hole (Fig. 20). Another way in which bulbs may be planted in grass is to turn up a spit of turf, hinging it over on one uncut side, and plant three or four bulbs in the soil below, returning the turf afterwards and treading it down firmly. August is the best month for naturalizing, but it may be done later when necessary.

The Best Hardy Bulbs.

There is a large number of hardy bulbs from which the amateur may make a selection. In the following list the name of the bulb is given first, followed by best soil, best position, time to plant, depth to plant, height in inches, colour of flowers, and flowering period :

ALLIUM (Ornamental Onion) : ordinary soil, any position ; autumn ; 2-in. to 3-in. ; 12-in. to 18-in. ; various colours ; May to July.

ALESTROEMERIA (Peruvian Lily) : light soil, with lime rubble ; sunny, sheltered position ; spring ; 5-in. ; 24-in. to 48-in. ; yellow, red, pink, etc. ; July.

AMARYLLIS (Belladonna Lily) : rich, sandy loam ; sunny, at foot of wall ; June ; 9-in. ; 12-in. to 18-in. ; rose ; August and September.

ANEMONE ; Poppy : rich, sandy soil ; sunny beds and borders ; early autumn ; 2-in. to 3-in. ; 9-in. ; various colours ; spring and summer.

ANEMONE (French) : rich, sandy soil ; sunny beds and borders ; early autumn ; 2-in. to 3-in. ; 12-in. ; various colours ; May.

ANEMONE (Wood) : loam and leaf mould ;

grass and rock gardens; September; 2-in. to 3-in.; 4-in. to 8-in.; white, yellow, etc.; April and May.

CALOCHORTUS (Mariposa Lily): leaf soil and sand; sunny bed; autumn; 3-in.; 8-in. to 15-in.; yellow, lilac, etc.; June to August.

CHIONODOXA (Glory of the Snow), ordinary soil; border, grass or rock garden; early autumn; 3-in. to 4-in.; 4-in. to 5-in.; purple, blue, white; March.

COLCHICUM (Meadow Saffron): ordinary soil; border, grass or rock garden; July; 4-in.; 6-in. to 9-in.; red, crimson, purple, white; August to November.

CRINUM: ordinary soil; south wall; autumn and spring; 9-in.; 12-in. to 24-in.; white, rose; summer.

CROCUS: ordinary soil; grass, borders or rock garden; early autumn for spring flowering and July for autumn flowering; 2-in. to 3-in.; 4-in.; various colours; spring and autumn.

CYCLAMEN: loam with leaf soil, sand and old mortar; grass under trees; early autumn; plant just below the surface; 3-in. to 4-in.; red, purple, rose, etc.; January, March and September.

DAHLIA (Decorative): deep, rich moist soil; beds and borders; early May; 6-in.; 24-in. to 60-in.; various self-coloured; July onwards.

DAHLIA (Paeony-flowered): deep, rich moist soil; beds and borders; early May; 6-in.; 48-in. to 60-in.; various bi-colours; July onwards.

DAHLIA (Double): deep, rich moist soil; beds and borders; early May; 6-in.; 36-in. to 48-in.; various self-coloured; July onwards.

DAHLIA, MIGNON (Tom Thumb): deep, rich moist soil; beds and borders; early May;

6-in.; 12-in. to 18-in.; chiefly shades of red; July onwards.

ERANTHIS (Winter Aconite): ordinary soil; grass or shrubbery; autumn; 2-in. to 3-in.; 3-in. to 4-in.; golden colour; January and February.

ERYTHRONIUM (Dog's Tooth Violet): loam with leaf soil and sand; autumn; 2-in.; 8-in. to 12-in.; various colours; March to May.

FRITILLARIA (Snake's Head Lily): loamy soil; beds and borders; early autumn; 3-in.; 6-in. to 48-in.; shades of yellow, red, etc.; March and April.

GALANTHUS (Snowdrop): ordinary soil; grass; August and September; 2-in. to 3-in.; 4-in. to 8-in.; white; January.

GLADIOLUS (Sword Lily): rich soil; borders or special beds; March, April and May; 3-in. to 6-in.; 24-in. to 36-in.; various colours; late summer and early autumn.

HYACINTHUS (Hyacinth): sandy soil, enriched with leaf mould; beds and borders; September to November; 6-in. to 7-in.; 9-in.; various colours; May and June.

IRIS (Dutch): light soil preferred; special beds and borders; autumn; 3-in.; 18-in. to 24-in.; blue, yellow, white; early June.

IRIS (English): ordinary soil; special beds or borders; September and October; 3-in.; 30-in.; various colours; early July.

IRIS (Spanish): ordinary soil; special beds or borders; September; 3-in.; 24-in.; various colours; June.

MONTBRETIA: rich, well-drained soil; grass, beds or borders; March and April; 3-in.; 24-in. to 48-in.; yellows and orange; June.

MUSCARI (Grape Hyacinth): loamy soil; grass, rock garden or borders; autumn; 2-in.

to 3-in.; 6-in. to 9-in.; blues, white; March and April.

NARCISSUS (Daffodil): ordinary soil; borders, wild garden, grass or shrubbery; October; 3-in. to 4-in.; 18-in.; yellow; May.

ORNITHOGALUM (Star of Bethlehem): ordinary soil; grass; autumn; 3-in.; 6-in. to 24-in.; white and green and white; April and May.

OXALIS (Wood Sorrel): light soil; grass or rock garden; autumn; 2-in.; 3-in. to 9-in.; various colours; May and June.

RANUNCULUS: ordinary soil enriched with leaf mould; sunny borders; February and March; 2-in. to 3-in.; 9-in. to 24-in.; various colours; summer.

SCILLA (Squill): ordinary soil; borders, grass or rock garden; early autumn; 1½-in. to 2-in.; 6-in. to 12-in.; blue, rose, white; February to April.

TIGRIDIA (Tiger Flower): light, sandy soil; rock garden; April; 2-in.; 12-in.; violet, yellow, purple tints, ivory-white blotched with carmine; summer.

TULIP (Early): ordinary soil; beds and borders; September and October; 4-in. to 5-in.; 9-in. to 12-in.; various colours; April.

TULIP (Darwin and Cottage): these are treated as Early Tulips but flower in May and May and June respectively.

Lily-of-the-Valley.

This subject is such a general favourite that it deserves special attention. To obtain the best results Lily-of-the-Valley should be allowed to remain in the soil for some years; the only time they should be lifted is when they get so crowded that the flowers begin to lose size and fragrance. Proper preparation of the bed is, therefore, essential. The ground should be well dug and given a moderate dressing of manure, leaf mould and a little sand.

The flowering period is only a short one at best, but a succession of blooms may be secured by planting three different beds. One prepared in a sunny spot will produce early blooms; a second which is shaded during part of the day will produce the main crop; and a third bed on a north border will yield later flowers.

When it becomes necessary to remake the bed the plants should be lifted and pulled into single pieces, but care must be taken to see that each crown possesses roots. At this time the crowns should be sorted into their respective class; the largest and stoutest ones have embryo flower buds within and will bloom the following spring; the medium ones—the two-year-olds—will flower a year later; the smallest—those produced during the past season—will need a couple of seasons before they flower. When making the beds in October, therefore, this should be remembered and only crowns of the same year's growth should be planted together. Plant 4-in. to 6-in. apart with the tips just showing above ground.

The established beds should be attended to in June. Hoeing first will clear off the weeds and open the surface soil when, if the foliage be not too thick, a light dressing of decayed manure should be given. When manure cannot be used at this time a little light soil should be scattered between the plants and two or three applications of weak liquid manure given during the summer.

Bulb Culture under Glass.

As already mentioned, bulbs may easily be grown in water, fibre, shingle and soil. Growing in water is not recommended, however, since equally good results are secured when fibre is employed, while in the latter case the bulbs may be used year after year, a thing that is not possible when water is the sole medium used.

Those who do not possess a greenhouse – either frost-proof or heated need not hesitate to grow bulbous plants in the dwelling-house. They may be cultivated in bowls in fibre with the greatest ease, and as no drainage holes need be provided the bowls may be stood on any polished surface.

The easiest bulbs to grow in this manner are Daffodils, Hyacinths, Tulips and Narcissi, but with a little extra care Crocuses, Irises, Muscari, Snowdrops and various other bulbs may be cultivated. No forcing is necessary; the main requirements are a sufficient degree of moisture at the roots and preventing the fibre from becoming sour.

Specially prepared fibre should be bought, but it should be sorted over and the largest pieces of charcoal abstracted. If dry the fibre should be heaped up and watered until the liquid begins to trickle from the heap it must be well soaked.

The bowls should be broader in surface than in depth; narrow topped ones are undesirable. A few lumps of charcoal should be placed in the bottom of the bowl and the latter half filled with fibre and pressed firmly down. The bulbs should be put on top of this layer about 1-in. apart all round and then covered to within

½-in. of their tops with more fibre. As soon as planted a copious supply of water should be poured into the bowl and left for half an hour, when the surplus water may be drained off by tilting. Periodic watering later is necessary, this being done in the manner described.

The next step is highly important and yet it is one that is seldom practised by the amateur. The bowls should not be stood directly in a dark cupboard, but should be taken outside, plunged into ashes and covered to a depth of 5-in. with the same material and left for a month. This encourages root formation before the shoots begin to develop a very essential detail for successful culture. At the end of a month the bowls should be lifted and examined for injury from mice or other pests, allowed to remain in the open for an hour or so and then reburied. After the lapse of another two weeks they should be lifted again and any which show pale cream shoots can be brought out, the others being returned until they reach this stage. When once removed from the ashes the bowls should be kept in semi-darkness in a cupboard for a week and then brought out into the daylight.

The best results are obtained when the bulbs are placed into the fibre in August or September. A succession of blooms can be secured by selecting early and later flowering subjects.

When a greenhouse is available soil is undoubtedly the best rooting medium to employ. A good compost for general use with bulbous plants consists of three parts loam, two parts leaf mould, one part rotted manure, and a sprinkling of sand.

The following bulbs are well worthy the attention of all amateur gardeners :

ACHIMENES: Plant in January and February 1-in. apart in hanging baskets or pots; the flowers in various colours are produced from July to October on plants from 12-in. to 24-in. in height.

AMARYLLIS (Belladonna Lily): Plant in September, placing one bulb in each 5-in. pot; various coloured flowers in April and May on plants 2-ft. high.

BEGONIA (Tuberous-rooted): Plant in March, one in each 6-in. pot; various coloured flowers from July to October; height 18-in.; gradually withhold water in the autumn and keep dry during the winter and start into growth in February or March.

CALLA ELLIOTIANA (Yellow Arum Lily): Although named the same this Lily is distinct from the White Arum Lily (Richardia); plant in February; flowers in August; withhold water after flowering and keep dry during the winter.

FREESIA: Plant in July and early August, putting six into each 6-in. pot; various coloured flowers are produced from December to February on plants attaining a height of 18-in.; gradually withhold water in spring when the leaves turn colour; keep in a sunny frame during the summer, lift in July and sort bulbs for size and repot.

GLADIOLUS: Plant the Bride variety in February, putting four bulbs into each 6-in. pot; plunge under 4-in. of ashes in the open until there is 1-in. of top growth, then remove to greenhouse: the white flowers are produced in spring and early summer.

GLOXINIA: Plant in February and March one corm in each 4½-in. pot; various coloured flowers from June to October on 9-in. high plants. This subject may be raised from seed under glass in January.

HYACINTH: Plant the Roman and Italian varieties in August and September, 1-in. apart in fairly large pots; cover with ashes until 1-in. of top growth is visible: various colours from November to January, height 1-ft.

NARCISSUS: The Paper White and the Double White should be planted in August and September, three bulbs to each 5-in. pot; cover with ashes, as before; white flowers from November to January; height 18-in.

NERINE (Guernsey Lily): Plant in August, two bulbs to each 6-in. pot; rose-coloured and salmon flowers in October; height 2½-ft. Keep on a shelf near the glass and water during the winter; give less water when the leaves begin to die; keep in a sunny frame during the summer, withhold water until the new flower stems appear when watering should be started again. Repotting is seldom necessary, but a little top soil should be removed annually and fresh applied.

OXALIS: Plant in September five bulbs in each 6-in. pot; the crimson, yellow and pink flowers appear in January; height 6-in.

PERSIAN CYCLAMEN: Plant the corms in July, one in each 6-in. pot; the various coloured flowers on the 1-ft. high plants appear from February to April. The pots should be stood in water to their rims and given a good soaking, they should then be placed in a closed and shaded frame for a few days. When growth has started the plants should be knocked out of their pots, the old soil removed from the roots and repotted in rather lumpy loam, with a little leaf mould and sand in 3½-in. pots. The corms should be just above the surface of the soil; keep closed for a few days, then remove to greenhouse.

RICHARDIA (White Arum Lily): Plant one bulb in a 6-in. pot in September, or three in a 9-in. pot, using turfy loam enriched with cow manure or leaf mould; the point of the crown should be just above the surface. Keep out-of-doors until frost is expected. The flowers are produced in April. Do not dry off after flowering, since growth continues throughout the year; hence occasional waterings and doses of weak liquid manure are necessary.

TULIP: Plant several bulbs in each 6-in. pot in September; the brilliant and varied coloured flowers appear in January if a maximum temperature of 65 degrees be maintained after growth is well advanced. As with other bulbs of a like nature the pots should be plunged into ashes until 1-in. of growth is present.

VALLOTA PURPUREA (Scarborough Lily): Plant in June, one bulb in each 7-in. pot; the scarlet flowers appear in August and September. The bulbs should not be dried off after flowering they should be left undisturbed for some years To produce the best blooms feed with weekly doses of weak liquid manure until the flowers begin to open.

CHAPTER X

GREENHOUSE PLANTS

THE possession of a heated greenhouse, with a minimum temperature of 55 to 60 degrees, is not by any means a necessity, but there is no question that much more may be accomplished with such a structure in the way of securing a succession of flowering plants throughout the year than with either a frost-proof or a cold house. In the vast majority of instances, however, a frost-proof house, with a minimum winter night temperature of about 45 degrees, is all that can be provided by the amateur gardener. Even with such a greenhouse however, there is no reason why there should not be a continuous supply of flowers during the winter, either for cutting or decorating the dwelling-house with pot plants.

The frost-proof greenhouse is valuable in another way. Without it it is impossible to secure early crops of vegetables, since these must be raised from seed under glass in the early part of the year, while the half-hardy annuals must also be raised in the same manner. It is true that a heated frame may be employed for raising early seedlings, but unless a number of frames be available one's opportunities are restricted.

The heated house is not discussed in this book; it is thought better to confine all remarks to the frost-proof and cold houses, since the first mentioned requires specialist treatment and management. Space does not permit of a full discussion of the requirements of delicate plants such as grown in the heated house; therefore, no details are given.

Special Greenhouse Subjects.

Roses, Sweet Peas, Chrysanthemums and bulbs may all be successfully grown under glass and with these subjects alone a magnificent winter display may be secured. Particulars have already been given in connexion with the cultivation of these plants in Chapters VIII and IX; hence no further reference to them is necessary.

With a frost-proof house, however, it would be folly to confine one's efforts to growing the subjects named, since there is a number of other flowering plants and shrubs which are truly beautiful and which require the minimum of attention. Some of these, at any rate, should be cultivated, so that variety is obtained throughout the whole of the twelve months.

Although some general hints on greenhouse management are appended it is impossible to lay down any hard and fast rules, for the reason that each subject requires slightly different treatment to enable it to give of its best. Each recommended subject is, therefore, dealt with on its merits and all necessary particulars are given.

The following plants are all suitable for growing in the amateur's frost-proof greenhouse:

ABUTILON: This is a valuable subject as a climber for pillars, and the wall of a lean-to house, but may also be grown in pots. It may be raised from seed in February or from cuttings at the same time. The flowers are white, yellow and red and appear from August to November on plants attaining a height of 2½-ft. and upwards. One plant should be grown in each 6-in. pot. Good varieties are Boule de Neige (white), Golden Fleece (yellow), and Firefly (red).

ACACIA : The Australian Mimosa is a useful shrub for growing as it produces its flowers from December to April. Increased by cuttings in the propagating case in May. Good varieties, all yellow in colour, are Armata, Drummondii, Hastulata and Verticillata.

ARCTOTIS GRANDIS : Increased from seed sown in March, the white flowers appear in July on plants 2-ft. in height ; one plant in each 4-in. pot.

BEGONIA (Fibrous-rooted) : This is an extensive family and well worthy the attention of the amateur. Gloire de Lorraine, with its bright rose flowers from October to March is strongly recommended. It grows to a height of 1-ft. ; one plant in each 6-in. pot. After flowering the plants should be given less water for a few weeks. When new growth begins the young shoots may be used as cuttings.

BROWALLIA SPECIOSA : The flowers, purple in colour, appear in July on 1-ft. tall plants. Increased from seed sown in February and March.

CALCEOLARIA HERBACEOUS : The seed should be sown in June and the seedlings grown along over the summer in a cold frame ; repot as necessary, with the final repotting in February placing one plant into each 7-in. pot, using a compost of loam and peat one part each with quarter part of old manure. The various pouch-like flowers are produced from May to August on 2-ft. high plants.

CARNATION: Cuttings of the Perpetual-Flowering Carnations should be inserted in very sandy soil in January and placed into a propagating case; stand outside during the summer, removing the points of the shoots once or twice to induce bushy growth the last time at the end of June. Place in greenhouse in August and disbud so that each stem only carries one bloom; may also be raised from seed sown in January. Good varieties are Carola (crimson), White Pearl (white), Edward Allwood (scarlet), Maine Sunshine (yellow) and Apricot (apricot and rose). The various coloured flowers are borne in November and onwards; best compost, with one plant in each 6-in. pot, is loam, two parts, manure one part, and sand half part.

MALMAISON CARNATIONS are increased by layers put down about midsummer. When the flowers are over the plants should be taken out of their pots, placed on their sides in a bed of soil in a frame and the shoots pegged down. The same sized pots and compost should be used as for Perpetual-Flowering Carnations. Good varieties are Duchess of Westminster, Iolanthe, Maggie Hodgson, Mercia and Old Blush.

CINERARIA: The seed should be sown from April to June, so that the various coloured flowers, either large single, star-flowered or cactus-flowered, will appear in succession from November to April. One plant in each 6-in. pot; best compost loam two parts, leaf mould one part, manure half part and sand half part. Height 18-in.

COLEUS: The blue-flowered 3-ft. high plant with its brilliantly coloured leaves, is at its best from January to March. Increased by cuttings in February and March and from seed in February. One plant in each 6-in. pot; compost as for Cineraria. Height 3-ft.

ERICA: The South African Heaths bear their flowers in winter and are, therefore, valuable; increased by cuttings inserted under a bell-glass in May in sandy soil. Compost, peat two parts, sand half part.

FERNS: The amateur is not advised to attempt the cultivation of any of the more delicate ferns, since the conditions necessary are those which cannot be provided in the average greenhouse. A warm moist atmosphere is necessary; conditions which are prejudicial to ordinary flowering plants.

FUCHSIA: The seed should be sown in January and February or from cuttings taken off the old plants in spring. The various coloured flowers are borne in July and August on plants varying from 2-ft. to 20-ft. in height. One plant in each 6-in. pot, but larger pots for the climbers. Best compost loam two parts, peat one part, leaf mould half part and sand half part.

GESNERA: The seed should be sown in January; the various coloured flowers are borne from October to December on plants reaching 9-in.; one plant in each 4½-in. pot in a compost consisting of loam two parts, leaf mould one part, and sand one part.

GREVILLEA ROBUSTA: Seed sown in January, one plant in each 6-in. pot, this plant is remarkable for its beautiful green foliage. Height up to 8-ft., compost as for Gesnera.

HOYA CARNOSA: This Wax-Flower is propagated by means of cuttings inserted in February and March; the pink and white flowers appear from June to August on plants up to 12-ft. One plant in each 7-in. pot.

Lilium: The best Lilies for growing under glass are Auratum (the white, golden-rayed, crimson-spotted hill Lily of Japan in its many varieties), Hansonii (Japanese Yellow), Martagon Lily, Henryi (branching heads of numerous flowers of a soft orange yellow), Krameri (rose pink Lily from South Japan), Longiflorum Wilsoni (frequently bears a dozen large white trumpet flowers on a single stem), Speciosum (handsome flowers with reflexing petals), and Umbellatum (the one European Lily worth growing). The best compost is a mixture of peat, loam and sand with a few pieces of charcoal intermixed. The bulbs should be potted as soon as they can be bought in the autumn, placing each one into a 7-in., 8-in. or 9-in. pot. Place in frame under fibre until 1-in. of top growth has formed. Give weekly doses of weak liquid manure when flower buds are well advanced. The Lilies flower towards the end of June.

Lily-of-the-Valley: Three-year-old crowns should be lifted from the garden bed in October potting ten in each 5-in. pot. A better plan, however, is to buy "retarded" crowns, these being firmly potted, 1-in. apart, with their tips just below the surface of the soil. The pots should be placed over the hot-water pipes and covered with 4-in. of coconut fibre. As soon as the flower spikes appear above the fibre this may be removed. The soil must be kept uniformly moist. The flowers appear from four to seven weeks after planting, according to the temperature of the greenhouse.

Nemesis bicornis: Sow the seed in March; the purple flowers appear in July on plants 1-ft. tall. One plant in each 4-in. pot; compost as for Gesnera.

PELARGONIUM, ZONAL: The Zonal Geraniums are increased by cuttings inserted in February and March; the various coloured flowers are at their best from December onwards, on plants 18-in. high. The best compost for all Pelargoniums is loam, one part; peat, one part; manure, one part; and leaf mould, one part.

PELARGONIUM, SHOW, FANCY: Increased by cuttings in June; Various coloured flowers from June to September on plants 18-in. tall. One plant in each 6-in. pot. Compost, as above.

PRIMULA: The seed of the Chinese Primula should be sown in March, April and May for a succession of the various coloured flowers, on plants attaining from 6-in. to 18-in. in height; from November to January. One plant in each 5-in. pot in a compost of loam, two parts; leaf mould, one part; manure, half part, and sand half part.

SALVIA SPLENDENS: This sage may be raised either from seed or by means of cuttings in March. The scarlet flowers are borne on 3-ft. high plants from August to January. One plant in each 8-in. pot, in a compost of loam, one part; peat, one part, and manure, one part.

SCHIZANTHUS: For flowering from June to August the seed should be sown in March, for flowering from January to March in August and September. The plants, from 18-in. to 2-ft. in height bear various coloured flowers; one plant in each 5-in. pot, in a compost of loam, two parts; leaf mould, one part: peat, one part; and sand, half part.

SOLANUM: The orange-red berries are produced in December; the seed should be sown in January. The plants attain a height of 18-in.; one plant being grown in each 6-in.

pot in a compost consisting of loam, two parts; leaf mould, one part; manure, half part; and sand, half part.

STREPTOCARPUS: The seed of the Cape Primrose should be sown in January and February; the various coloured flowers appear in June and July on plants 8-in. in height. One plant in each 5-in. pot in a compost of loam, two parts; leaf mould, one part; manure, half part; and sand, half part.

THUNBERGIA ALATA: To secure the buff coloured flowers from June to August the seed should be sown in March. The plants—which only reach a height of 4-in.—should be placed a number together in each 5-in. pot in a compost of loam two parts; leaf mould, one part; manure, half part; and sand, half part.

VIOLA ODORATA: The young Sweet Violet plants should be propagated in May from rooted runners and grown in the reserve border during the summer, being transferred to a heated frame or potted and placed in the greenhouse in September. The best compost consists of loam, one part; peat, one part; manure, half part; and sand, one part. The best Violets for growing under glass are Princess of Wales, Marie Louise, de Parme and Neapolitan.

The Unheated Greenhouse.

Hardy plants which bloom out-of-doors during the colder months of the year are not numerous, but these must be chiefly relied upon to furnish the cold greenhouse during the winter. The Laurustinus, an evergreen shrub with charming pink buds and white flowers and the winter-flowering Winter Jasmine are useful for the purpose. These both require cutting back after the flowers are over, so that new growth may be formed in good time for the following winter. The Lenten and Christmas Roses, Primrose, Wallflower, Polyanthus and Violet may all be used. They should be potted up in the autumn and they will flower many weeks before those grown in the open. A very attractive subject is the Heath. The winter-flowering Heaths, especially Erica mediterranea hybrida and E. carnea, last a long time in bloom and are strongly recommended as beautiful plants. Berried plants are always attractive and one of the best is Pernettya mucronata, which bears berries of various colours.

A very fascinating hobby for the owner of a cold greenhouse is the cultivation of Alpine plants, especially when space does not permit of creating a rock garden. The dainty blooms are seen at their best when protected from the weather. As soon as the blooms are over the plants should be potted, so that they have the summer to get properly established. Some of the best Alpines for this purpose are the various Anemones, Saxifrage (Rockfoil), Primula denticulata, rosea and marginata, Dog's Tooth Violet, Muscari (Grape Hyacinth), Trillium, Fritillaria, Aubrietia, Everygreen Candytuft (Iberis sempervirens), and Moss Pink (Phlox subulata).

A further addition can be made by buying early-flowering shrubs and potting them in early winter. They will not bloom during the winter, but they will come into flower some time before those in the open. A delightful spring display can be secured by using Rhododendron, Azalea, Deutzia, Lilac and similar subjects. Bulbs, too, may be had in flower long before those in the open if grown in the cold house.

These should be treated as explained in Chapter IX.

Among other plants that may be employed for the adornment of the cold greenhouse are the following: Dielytra spectabilis (Bleeding Heart), Solomon's Seal, Lily-of-the-Valley, Primula stellata, P. Obconica and Herbaceous Calceolaria Autumn-sown Schizanthus, Clarkia and Godetia may also be pressed into service.

The plants should be watered in the morning in the winter, while if the ventilators be opened —as they must be on occasion- they should be closed about midday, so that as much heat is conserved as possible. Lukewarm water should be used for watering.

Care of Greenhouse Plants.

A very important duty is watering. Much loss is occasioned if this be done in a careless manner. During spring and summer the vast majority of greenhouse subjects should be watered twice a day; in winter once or at most twice a week is ample. The main thing is that the soil must always be kept moist, neither dry nor waterlogged. A good watering when required is infinitely better than frequent sprinklings.

The amateur can tell at once whether a pot plant requires water or not. If the pot be held in the hand and tapped smartly on the side with the knuckles a sharp sound indicates the need for watering; a dull sound implies that it is not necessary. In winter water in the morning and use water 5 degrees above the greenhouse temperature; in summer water in late afternoon or early evening. Syringe in summer at morning and evening; in spring and autumn in the morning only. The atmosphere must be kept fairly dry during the winter months, but during the summer the path may be watered once a day.

Plenty of fresh air is essential to most plants. During the winter this must, of course, be done carefully and never in frosty weather; hence only the top ventilators should be used. Later in the season both ventilators and windows may be opened.

During a spell of brilliant sunshine the roof of the house should be shaded; this tends to prolong the blooming period.

As regards feeding greenhouse plants, it may be taken that all benefit during the period of active growth by weekly doses of weak liquid manure alternated with soot water. With some subjects, however, special proprietary manures and fertilizers should be employed, such as for Roses, Sweet Peas, Chrysanthemums and Carnations.

THE VEGETABLE GARDEN

CHAPTER XI

PLOTS AND ROTATION

THE work of looking after the vegetable garden is rendered easier and the cost of the necessary manure is less when the various plots are planned in a proper manner. When making a new garden it is a simple matter to arrange for four main vegetable plots, with broad borders under the four boundary walls or hedges, but it may take a little contriving in the case of an established garden. There is a definite reason why four main plots should be provided. It is suggested that what is known as the four course system of rotation should be followed; that is, the same crops only return to a given plot every four years.

When laying out the garden, therefore, these four plots—of equal size—should be the first consideration. The borders should be from 5-ft. to 8-ft. in depth, according to the size of the garden, while the main paths should be 4-ft. wide and the secondary paths 3-ft. The best kind of edging for the vegetable plots is wood. Battens 5-in. wide and 1-in. thick, thoroughly soaked in creosote or tar should be used in preference to any other material. Live edges are a nuisance in this section of the garden, as they not only require a considerable amount of attention, but they rob the soil of some of its plant food.

The four main plots should be employed for growing the ordinary vegetables. The border under the north boundary will prove valuable for producing early crops of some of the smaller and finer sorts, together with the salading; the east border may be used for the Strawberry bed; the west border for some of the permanent crops; and the south border will serve splendidly for the summer crops of Carrots, salading and Onions. The permanent crops, such as Asparagus, Jerusalem Artichokes, Horseradish, Rhubarb and Seakale, may also be grown at the ends of the four main plots, if room cannot be found for them in the west border. The Globe Artichokes may either be grown in a special bed or they may be dotted along the edges of the main plots. These are ornamental plants and placed at regular intervals along the sides of the main plots they relieve the otherwise bare appearance of the whole.

As far as possible the north and east boundaries should be solid, constructed of brick, stone or wood, but those on the south and west may well be in the form of hedges. It is essential to have an effective windbreak on the north and east sides if early crops are to be secured.

Formulating a Cropping Plan.

One of the most important duties when the garden is first of all taken over is to formulate a proper cropping plan. If this be done at the beginning the necessary conditions for all subjects to be cultivated can be secured with the least expenditure of time and money. There is a number of reasons why this plan should be arranged in advance. Briefly stated, these are that the different groups of crops take different plant foods from the soil; the different crops gather their food in a different manner; and when special conditions are necessary the ground may be prepared in advance at the time of the autumn digging.

Various crops make quite different demands on the soil. Some require a large quantity of one form of plant food—the three chief foods are nitrogenous, phosphatic and potassic—such as Potatoes, which need a plentiful supply of potash, Cabbages which do not require much potash, but must have an abundance of lime, and Beans and Peas which do not want nitrogen, since their roots are furnished with nodules which are able to gather free nitrogen from the soil. By working to a definite plan, therefore, one crop may follow another so that the second will take from the soil those substances which have not been taken by the one previous. Some plants gather their food from the surface soil; others delve deeply. By allowing one to follow the other the plant food from both the first and second spit of soil is made use of before it becomes necessary to apply manure to the land. It is suggested later that the best way to grow Beans and Peas is in trenches—the same is true, of course, of Celery—therefore, if the site be decided beforehand the trenches can be made during the winter when the ground is being dug; hence labour is saved.

It is impossible to lay down any hard and fast rules in connexion with the cropping plan, since it is not all amateur gardeners who will desire to grow the many and varied crops which are possible. For instance, when the space available is limited it is a mistake to devote too much ground to such subjects as Cabbages, Sprouts, Cauliflowers and Winter Greens. Under such conditions the endeavour should be to cultivate more of the finer and choicer sorts, leaving the plants in the Brassica family alone. The best advice that can be given, therefore, is to suggest the order in which the crops should follow each other on the various plots, although later suggestions are made relative to the most satisfactory plan that can be adopted in the garden of average dimensions.

Beans and Peas should follow Broccoli, Cabbages, Carrots, Parsnips or Potatoes; followed by any of the Cabbage family, Celery, Leeks, Lettuces or Turnips.

Beetroots should follow any of the Cabbage family, Carrots, Parsnips, Spinach or Turnips; followed by Beans, Cabbages, Cauliflowers, Lettuces or Peas, but on no account should Carrots, Parsnips, Spinach or Turnips be planted after Beetroots.

Broccoli should come after Beans or Peas, followed by almost any crops that can be removed from the ground in time for planting, excepting those belonging to the same family.

Brussel Sprouts should follow Beans, Lettuces, Peas or Potatoes, followed by Beans, Beetroot, Carrots, Celery, Onions, Parsnips, Peas or Potatoes.

Cabbages may come after Beans, Lettuces, Onions, Peas or Potatoes, followed by any crop save those of the same family.

Carrots, Turnips and Parsnips may be followed by any crop excepting a root crop and is best followed by Celery or Parsley, but may be by all save roots.

Celery should be planted after any crop which is cleared off the ground in time and which allows for preparing the trenches in a proper manner, and is best followed by Beans, the Cabbage family, Onions, Peas, Potatoes or Turnips.

Endive does best after Beans or Peas, but may follow any of the Cabbage family or Potatoes, followed by any crop excepting Lettuces.

Leeks should never come before or after Onions or Shallots, but may be followed by and follow any other.

Lettuces should follow Beans, any of the Cabbage family, Peas or Potatoes, followed by any crop excepting Endive and Artichokes.

Onions come well after Beans, the Cabbage family, Celery, Peas or Potatoes and are best followed by Beans, Cabbage or Peas.

Potatoes may follow any crop excepting Beetroot, Carrots or Parsnips and be followed by the same.

Seakale is generally grown in a separate bed, but when included in the rotation of cropping it should follow Potatoes and be followed by Beans, Peas or Potatoes.

Shallots should be planted after Beans, Cabbages, Endive, Peas, Potatoes or Spinach, followed by any crop excepting Onions and Leeks.

Spinach may follow Beans, Cabbages, Cauliflowers, Lettuces or Peas and be followed by any spring crop.

Preparing the Plots.

When making a new garden the ground must be treated rather differently than when an established garden is taken over. The chief difference is that rather more manure should be applied to the ground in the former case, as in all probability the soil will be rather deficient in plant food. At the same time, if the new garden be created from pasture land it will probably contain many insect pests; hence a dressing of some suitable soil fumigant should be given. In addition to this the soil should be tested for its lime content and some added, if necessary. The exact manner in which it should be trenched will depend upon the nature of the first and second spits of soil. It may easily happen that the clay or heavy soil from the house foundations has been scattered over the garden site, in which case the second method of trenching, in which the first and second spits of soil are reversed when they are returned to the trench, should be adopted.

Before dealing with the best method of digging each plot it will be better to discuss the rotation of cropping which is suggested. Let us number the plots A, B, C and D. These are of equal size. Plot A is intended to carry Beans, Peas, Celery, Onions, etc.; plot B the roots, such as Beetroots, Carrots, Parsnips; plot C the greens, that is, the Cabbages, Cauliflowers, Winter Greens and some of the salading; and plot D Potatoes. Each plot must be treated in a different manner, so that the necessary conditions are provided for each class. When the garden is taken over plot A should be trenched and given a dressing of three barrowloads of manure per square rod (four barrowloads for a new garden); plot B should be mock trenched, but not manured (one barrowload of manure mixed with the third spit for a new garden); plot C should be single spit dug, but not manured; and plot D should be mock trenched and dressed with one and a half barrowloads of manure (two barrow loads for a new garden).

In the second year the roots will be planted on plot A, the greens on plot B, the Potatoes on plot C and the Beans, etc. on plot D; therefore, plot A should be mock trenched, but not manured; plot B should be single spit dug, but not manured; plot C should be mock trenched and dressed with one and a half barrowloads of manure; and plot D should be trenched and given a dressing of three barrowloads of manure.

If this plan be followed only one plot need be fully manured each year, one plot given a half dressing, while the remaining two need not be manured at all. Each plot is fully manured and half-manured in the first two years, then left for two years without manuring, yet all crops are ensured of an abundant supply of the right kind of plant food.

CHAPTER XII

VEGETABLES ALL THE YEAR ROUND

IT has been suggested in the previous chapter that at the time of the autumn digging two out of the four plots should be given a dressing of manure—a full application to one and a half application to the other. In this motor-age, however, it is seldom possible to secure adequate supplies of farmyard or stable manure ; hence the available supply must be supplemented with artificials. A full dressing of manure generally consists of three barrowloads of natural manure per square rod ; horse manure being used for preference on heavy soil and cow and pig manure on light land. If only one half of the desired quantity be available this should be used, but at the same time 3-lb. of basic slag and 1-lb. of sulphate of potash should be added on heavy soil or 2-lb. of kainit and 1½-lb. of crushed bones on light land. During the period of active growth the various subjects will require special treatment, such as described later in the chapter. If no natural manure be procurable resort should be had to one of the many substitutes on the market of which spent hops form the basis.

Vegetable Growing Hints.

The amateur gardener should always endeavour to secure early and late crops of the choicer vegetables which he grows. When space allows a long cropping period can be secured; failing the necessary amount of room it may be that the desire is to concentrate on early and late crops, contenting oneself by buying during the plentiful season. In the following cultural notes, therefore, suggestions are made for the production of almost out-of-season crops, as well as main crops, so that the amateur will understand what is necessary in each case. It must be realized, however, that there is always a certain amount of risk in growing very early and exceptionally late crops, but it is generally well worth while so doing, as half of the delight of gardening is to secure delicious, delicate vegetables when they cannot be procured—excepting at an exorbitant price—in the open market.

The following are the principal vegetables grown in the average garden:

BEAN, BROAD: The main crop is ready between July and September, but a sowing in September on a sunny border in a protected garden will give a much earlier crop. If this cannot be arranged a fairly early gathering can be secured by sowing under glass in January and February, the seedlings being planted out after hardening. In very mild districts a sowing is quite possible in the open towards the end of February or very early in March, but the main crop should be sown at three week intervals during the latter half of March, April and May. Beans and Peas should be grown on the trench method. A trench should be opened 2-ft. to 3-ft. wide and 2-ft. deep and the third spit broken up thoroughly with the fork. A layer of decayed vegetable rubbish and well rotted manure should be placed on top of the forked third spit to a depth of 4-in. and trodden down. Above this should come 4-in. of soil lightly mixed with rotted manure and then the trench should be filled to within 6-in. of the top with good soil. The seedlings should be transplanted into, or the seeds sown in this top soil, the seeds being placed on top and covered with 3-in. of good soil. The chief idea of growing Beans and Peas in a trench is that when they are being fed during the active growing period the manure can be confined to the roots and need not be applied to the surrounding ground. A few weeks after thinning water the rows with a solution of 1-oz. sulphate of iron to 1 gallon of water; a month later strew a very little powdered poultry manure or guano alongside the rows. Varieties recommended: Milecross Monarch, Mammoth Long-pod, Green Giant and Giant Windsor.

BEAN, KIDNEY OR FRENCH: The first sowing may be made in March in a cold frame, but the main crop should be sown in the open in succession from the beginning of April to the end of June in rows 2-ft. apart and the plants thinned to 3-in. to 4-in. asunder. Water the rows every three weeks with a solution of ½-oz. sulphate of potash to the gallon of water. Gather all pods as soon as large enough, as this tends to prolong the cropping season. Varieties recommended: Ne Plus Ultra, Masterpiece, and Canadian Wonder.

BEAN, RUNNER: It is of little use attempting to secure a very early crop of Runner Beans. The first sowing should be made in the open towards the end of April, but in some districts this is rather likely to fail. For the main crop sowings should be made every three weeks during May and June, in rows 2½-ft. apart for the dwarf varieties and 6-ft. apart for the tall varieties; the plants should be thinned to

6-in. asunder. Water rows every three weeks with solution of ½-oz. sulphate of potash to the gallon of water. Varieties recommended: Old Scarlet Runner, Best of All, Champion Emperor and Prizewinner.

BEETROOT: Both the Globe and Long varieties should be planted, since the former are ready from July to November and the latter from November to May; hence a long cropping season is ensured. The first sowing of the Globe Beetroot should be about mid-March and should be continued to mid-July; the Long sorts should be sown during the early part of May. All Long varieties and the Globe that have not already been pulled should be lifted in November, the leaves twisted off 3-in. from the crowns, placed in rows with dry sand sprinkled over them and finally covered with straw as a protection against frost. Plant in rows 1-ft. apart, thinning the Globe to 4-in. to 5-in. and the Long to 6-in. asunder. Two or three weeks after thinning water with a solution of 1-oz. sulphate of iron to the gallon; a month later scatter a very little poultry manure (powdered) or guano alongside the rows. Varieties recommended: Nutting's Dwarf Red, Galloway Purple, Dobbie's Purple and Pragnell's Exhibition.

BORECOLE (see Kale).

BROCCOLI: This may be looked upon as a hardy form of Cauliflower. There are three distinct kinds, namely, the autumn, winter and spring sorts. As space is generally at a premium in the average garden the spring varieties alone should be grown, since these are available for use during that time of year when fresh vegetables are extremely scarce. The spring kinds should be sown towards the end of April or the beginning of May and transplanted in July, 30-in. apart in rows 30-in. asunder. During the active growing period a little sulphate of ammonia should be applied as a top dressing every three or four weeks. Varieties recommended: Spring crop: Late Queen, Leamington, Metheven's June and White Sprouting.

Brussels Sprouts: A little seed should certainly be sown in heat in February so that plants will be available for planting out in the open in April or early May, while this should be followed by a second sowing—also under glass—at the beginning of March. Sowings in the open may be carried out during April in rows 30-in. apart and the plants 24-in. asunder. In early July ½-oz. of nitrate of soda per square yard should be applied, this being repeated at the end of the month, while a third application should be given about the middle of August. Varieties recommended: Newtownards Gem and Dalkeith.

Cabbage: A little Cabbage seed should be sown in heat at the same time as Brussels Sprouts in February; this will furnish an early supply. This should be followed by successional sowings in the open during March and April, while a single sowing may well be made in July. If this be done Cabbages will be available from April until November. The rows should be 24-in. apart and the plants 15-in. to 18-in. asunder. Once a month give each plant a pinch of nitrate of soda or ½-oz. per square yard. Varieties recommended: For sowing under glass, First and Best; for March and April sowing in the open, Enfield Market, Winningstadt and Favourite; for July sowing, Flower of Spring, Milecross Marrow, Velocity.

Carrot: Light, sandy soil grows the best Carrots; if the garden be heavy, therefore, holes should be specially prepared and filled with suitable soil, and three or four seeds sown in each station. The rows should be 1-ft. apart and the holes from 3-in. to 6-in. according to the variety grown. A very few early Carrots may be secured by sowing in February on a sunny, sheltered border, but as the thinnings are available for culinary purposes it is hardly necessary to go to this trouble, unless this vegetable be specially favoured for salads. The main sowings should take place in March and April in drills 1-ft. apart and 1-in. deep. If the Carrots appear to be standing still and not developing as they should in the early summer ½-oz. of nitrate of soda, ½-oz. sulphate of ammonia or 2-oz. of powdered poultry manure or guano should be applied to each square yard. Varieties recommended: Sutton's Scarlet, Long Red Surrey, Dobbie's Stump-rooted, Early Scarlet Nantes.

Cauliflower: This vegetable is such a favourite that it is always advisable to make an autumn sowing, the seed being sown on a sunny border during September; in October the plants should be transferred to a cold frame and transplanted into the open in April. To follow on this early crop a little seed should also be sown under glass in February, so that it will be ready—after hardening off—for transplanting into the open in May. The main crop should be sown in the open in April in a seed bed and planted out in May or June. Give a monthly application of ½-oz. of nitrate of soda per square yard during the active growing period. Varieties recommended: Autumn and sowing under glass, Early Dwarf Erfurt, Early

London, Early Snowball, Favourite; later sowings, Purity, Universal, Autumn Giant.

Celery: Celery should be planted in June and July, but the trenches should be made some weeks in advance when the ground is clear. The trench should be 48-in. wide, so that it will accommodate three rows, the plants being placed 10-in. to 12-in. apart in the rows. To obtain the best results the seed should be sown in heat in February and March, since it is seldom possible, excepting in very favoured spots, to raise the plants out of doors sufficiently early to produce a good crop. When digging the trench plenty of rich, old manure should be mixed with the soil, as Celery is a gross feeder. Although the ground be well manured in advance feeding should be carried out when the plants are established. If poultry manure be available 1-oz. per yard run of trench should be applied every week for six weeks after the plants are well established, say in early summer. If artificials are to be employed give an application of ½-oz. of nitrate of soda per square yard early in July, another at the end of July and a third about the middle of August and follow each application of nitrate of soda with a watering three days afterwards of ½-oz. of sulphate of potash to the gallon of water. Draw up a little soil round the plants at intervals. Varieties recommended: Grove Pink, Grove White, Sulham Prize.

Corn Salad (Lamb's Lettuce): This is a valuable salading. The seed should be sown from March to August in rows 1-ft. apart and the plants 4-in. to 5-in. asunder. No manure is required; the crop is ready from May to February.

Endive: This plant makes a delicious salad during the winter when Lettuce is scarce. Sow thinly in drills 15-in. apart and thin to 12-in. asunder from March to July. Endive must be blanched; this is done by covering the plants with pots or boxes or tying in the plants with raffia. Varieties recommended: Moss Curled, Green Curled, Green Batavian.

KALE OR BORECOLE: This is one of the hardiest of all the greens and is at its best during winter and spring when there is often a scarcity of this class of vegetable. The seed should be sown in the nursery garden about the middle of March, the plants being transplanted in June, allowing 3-ft. between the plants and 2½-ft. to 3-ft. between the rows. A north border suits this crop admirably—a border on which few vegetables can be cultivated successfully. Once a month each plant may be given a pinch of nitrate of soda, or ½-oz. per square yard. The Russian Kale is very delicate in flavour, but for general purposes the Tall Scotch is recommended.

LEEK: Good Leeks cannot be grown by sowing the seed in the open in late March or early April; to secure the best crop sowing under glass in February and March is essential. If this be done transplanting is possible in May and June, or perhaps early July, and large plants result. The rows should be 3-ft. apart and the plants 1-ft. asunder when the seedlings are raised early under glass or rather less when the seed is sown direct in the open. Leeks will stand any amount of feeding; a mixture that gives specially good results is watering with a solution of 1-oz. each of nitrate of soda, superphosphates and kainit to the gallon of water. Leeks should be grown in a trench, since earthing up, to blanch the stem, is essential. Varieties recommended: Champion, Lyon, International Prize, Musselburgh.

LETTUCE: Lettuces may be had during the greater part of the year by making a first sowing under glass in February, planting this out in May. Outdoor sowings should continue every three weeks from the beginning of March to the end of July, while an autumn sowing of some hardy variety is recommended. The plants should be grown wherever a spot can be found for them, being worked in with the larger growing subjects during their early stages. The rows should be 1-ft. apart and the plants from 8-in. to 10-in. asunder, according to variety. The amateur is advised to concentrate on the Cabbage varieties, since these are more easy to grow. No manure is required. Varieties recommended: Cabbage varieties New York Giant, Holborn Standard; Cos varieties, Giant White, White Heart.

MUSTARD: This may be sown practically throughout the year, being grown in any odd corner that can be found for it.

ONION: This crop does not succeed in all districts equally well, but with careful cultivation a good crop can generally be secured. A first sowing should be made under glass in January, the seedlings being transplanted into the open in May. March is early enough for the first outdoor sowing, the seed being sown where the onions are to grow and thinned out as necessary. The rows should be 12-in. to 15-in. apart and the plants 4-in. to 6-in. asunder. Onions benefit greatly by the application of a little nitrogenous manure, which should be applied in June or July. The best chemical is ⅓-oz. of nitrate of soda per square yard, but ⅓-oz. sulphate of ammonia or 2-oz. of dried poultry manure may also be employed. Varieties recommended : Under glass, Ailsa Craig, Golden Globe ; in the open, James Keeping, Danver's Yellow ; August sowing, Giant Rocco.

Parsnip : This crop may be sown quite early in the year in the open ; February is none too soon in the majority of districts. More seed should be sown in March, both lots being transplanted into rows 12-in. to 15-in. apart, with the plants 8-in. to 10-in. asunder. The roots may be lifted as required during the winter. From early June to early September fortnightly doses of sulphate of ammonia in very small quantities should be given. Varieties recommended : Hollow Crown, The Student, Elcomb's Improved.

Pea : Fresh Peas may be gathered from June to October by making a succession of sowings. Early varieties may be sown in the open in the autumn, another sowing should be made under glass in February and transplanted in April, while the main crop should be sown in the open during March and April at intervals of two weeks. A late sowing in May will continue the crop well into the autumn. Peas should be grown in trenches, as recommended for Beans ; the rows should be 2-ft. to 6-ft. apart, according to the variety grown, with the plants 3-in. asunder. The best manure for this crop is sulphate of potash, this being applied in liquid form every two weeks during the growing period at the rate of ½-oz. to the gallon of water. Varieties recommended : It is almost impossible to recommend any varieties specially, since there is such a vast number of truly excellent sorts. The following, however, may be selected with confidence : The Pilot, Manifold, Gradus, Glory of Devon, Rearguard and Royal Salute.

POTATO: If suitable varieties be planted a supply may be secured throughout the year. Very early new Potatoes may be obtained by using a bed of soil in a warm frame, planting the tubers in January. No attempt should be made to plant out-of-doors before March ; April in exposed districts. With the early varieties it is advisable to sprout the tubers before planting. The tubers should be set closely together, nose end uppermost, in a single layer in trays (Fig. 12), and placed into a light, cool, but frost-proof shed some three weeks before they are to be planted. The tubers for the main and late crops should not be sprouted. A little artificial manure is valuable for the main and late crops ; it is seldom necessary with the earlies. The best for the purpose is superphosphates and sulphate of ammonia, using 3-lb. of the former and 1-lb. of the latter per 40 yards of row. Care must be taken in applying this manure– it should be given just before earthing up—since if it touch the leaves it will scorch them. Varieties recommended : Early varieties, Arran Chief, Duke of York, Di Vernon, Harbinger, Witch Hill Early, Victory ; Second Early varieties, Kattie Glover, Ally, British Queen, Arran Comrade, King George, Catriona, Early Market, Stirling Castle ; Main crop varieties, Kerr's Pink, King Edward, Majestic, Abundance.

RADISH : Sow at any time between January and September, selecting spring and summer varieties, at intervals of two weeks. The drills should be 1-ft. apart or the seed may be broadcast. Varieties recommended : Turnip Red, Turnip White, Olive-Shaped Scarlet, French Breakfast.

SHALLOT : February and March are the best months for planting the bulbs. When planting draw up a little earth round them, removing this when growth begins.

SPINACH : This crop thrives well when grown between rows of Peas. A good plan is to make a sowing of Spinach whenever Peas are sown during the spring. To secure an early crop, however, an August sowing is recommended, using a prickly variety for the purpose. The rows should be 1-ft. apart and the plants thinned to 4-in. to 6-in. asunder. Grown in this manner no manure need be applied. Varieties recommended: The Garter, Victoria and Giant-Prickly.

TURNIP : Early Turnips are always in favour ; hence a sowing of some quick-growing variety should be made on a hotbed in a frame in February, with a second sowing in a frame in March. The first out-of-door sowing should be in early April, with successive sowings every two weeks until the middle of July. The rows should be 12-in. apart and the plants 4-in. to 6-in. asunder. Give small quantities of sulphate of ammonia every two weeks. Varieties recommended : Quick-growing Earliest, Model White, Early Milan ; Early Yellows, Golden Ball, Orange Jelly ; Later varieties, Chirk Castle, All the Year Round.

A Planting Chart.

In the foregoing paragraphs particulars are given regarding the cultivation of the majority of those vegetables which are grown in the average garden. There may be some amateur gardeners, however, who may desire to try their hands at other kinds which are not mentioned. These are, therefore, given in the following Planting Chart.

A VEGETABLE PLANTING CHART.

Subject	*Time of Sowing or Planting*	*Time of Transplanting*	*Rows Apart*	*Plants Apart*	*Principal Season of use*
			ft.	in.	
Bean, Broad ..	Oct.-Nov., Jan., April	—	2-3	4-6	July-Sept.
Bean, French ..	April-June	—	2	3-4	July-Oct.
Bean, Runner ..	May-June	—	6-tall 2½-dwarf	6	July-Oct.
Beetroot, Globe ..	March-July	—	1	4-5	July-Nov.
Beetroot, Long ..	May	—	1	6	Nov.-May
Borecole, *see* Kale					
Broccoli, Spring ..	April-May	June-July	2½	24-30	Feb.-April
Brussels Sprout ..	Feb.-April	June-July	2-3	24	Sept.-March
Cabbage, White .	March-May, July	May-July, Sept	2	15-18	April-Nov.
Cabbage, Red .	Feb., August	Oct., March	2	18	Nov.-Feb.
Capsicum	March (in heat)	June	2	18	September
Cardoon	April	—	4	12	Oct.-March
Carrot, Shorthorn ..	Feb.-Sept	-	1	3	June-Nov.
Carrot, Intermediate	March-April	—	1	4-6	Nov.-May
Cauliflower	Feb.-May	May-July	1½-2	18-24	June-Nov.
Celeriac	March	June	2	9-12	Oct.-Feb.
Celery	Feb.-March	May-July	4	10-12	Sept.-March

A VEGETABLE PLANTING CHART.

Subject	*Time of Sowing or Planting*	*Time of Transplanting*	*Rows Apart*	*Plants Apart*	*Principal Season of use*
			ft	in	
Chicory	April-June	April-June	1½	6-8	Oct.-Feb.
Colewort	June	August-Sept.	1	9-12	Oct.-Jan.
Corn Salad	March-August	–	1	5	May-Feb.
Cress	Throughout the Year		–	–	—
Endive	March-July	–	1½	12	June-Jan.
Garlic	Feb.-March		1	6	July-Feb.
Kale	April-May	June-August	2½-3	36	Nov.-April
Kohl Rabi	April-May	June-August	2	12	July-Dec.
Leek . ..	Feb.-March	May-July	3	12	Aug.-May
Lettuce	Feb.-August	April-Nov.	1	8-10	Year round
Mustard	Throughout the Year	–	—	—	—
Onion	Jan.-April, Aug.	March-April	1-1½	4-6	Year round
Parsnip . ..	Feb.-March	–	1-1½	8-10	Nov.-March
Pea . ..	Feb.-May	–	2-6	3	June-Oct.
Potato ..	Feb., March-April	–	2	12	Year round
Radish	Jan.-Sept.		1	—	April-Oct.
Shallot . ..	March	–	1	6	July-Jan.
Spinach . ..	Feb.-August	–	1	4-6	May-Feb.
Turnip	March-August	–	1	4-6	June-Feb.

Outdoor Mushroom Culture.

Mushroom growing in the open is not always a successful undertaking, but if care be exercised in preparing the bed a bounteous crop can be secured in most years. The bed should be prepared in August, fresh horse manure, with a considerable admixture of strawy litter, being employed for the purpose. The manure—three cartloads will prove ample for a bed 18-ft. in length—should be thrown into a heap under cover. When the pile begins to steam it should be turned inside out every second day, the heap being kept moderately moist meanwhile. With a good sample of manure three turnings is generally sufficient.

A ridge-shaped bed, 4-ft. at the base and rising to a point 3-ft. from the ground should be made, the manure being well trodden down as each layer is added. When made a thermometer should be thrust into the heap and the temperature read daily. When a steady heat of 80 degrees is recorded the bed may be planted with the spawn.

The spawn is purchased in brick form and is often marked with lines to indicate the size of the pieces to be used ; failing this break into sections, making a dozen out of each brick. Each piece should be inserted in the manure to a depth of 1-in., the pieces being 9-in. apart. The bed should then be covered with clean straw. At the end of a week the straw should be removed and the bed covered with about 1-in. of soil ; the straw should then be returned to position, making this about 1-ft. in depth, after covering the soil with sacks or canvas. Test for moistness every week by thrusting the finger into the soil ; water with tepid water if dry.

If the bed has been made properly from good manure the first mushrooms should make their appearance at the end of about six weeks. If none shows above ground by the end of the seventh week, examine the soil round one or two of the pieces of spawn and note whether there are any thread-like growths ; if present mushrooms will appear in good time, but failing the thread-like growths it indicates that either the bed was made improperly or the spawn was faulty. When pulling mushrooms fill in the holes with a little fresh soil, so as to encourage more to form. If they be cut and the stumps are left they will rot and destroy the bed.

When watering use a solution of 2-oz. of salt to the gallon of water, as this benefits growth.

CHAPTER XIII

PERMANENT VEGETABLE CROPS

IN the last chapter full details concerning the cultivation and special requirements of the ordinary crops are given, but reference must also be made to those permanent crops which should find a place in every garden where space permits. The subjects in question are Artichokes, Globe and Jerusalem, Asparagus, Horse-radish, Rhubarb, Seakale and Vegetable Marrow. The last mentioned is not exactly a permanent crop, but it cannot be included in the rotation of cropping, since a special site must be found for it. The following cultural hints will prove useful:

ARTICHOKE (Globe): These ornamental and productive plants may be grown in a special bed, but a better plan is to arrange them singly at stated intervals along the sides of the main plots. Globe Artichokes may easily be raised from seed, but it is better to increase them by division of the root-stock or by planting suitable suckers. The station for each plant should be trenched and lightly manured in February and the soil dusted with soot. The plants should be inserted in April; if in rows in a special bed there should be 4-ft. between each plant. This subject bears well for four or five years; to obtain a succession of heads for cuttings every year a few new plants should be inserted annually. About the middle of October, when all the heads have been gathered, the plants should be cut back ; in November each crown should be covered with earth, wood ashes or litter. All but three suckers should be removed from each plant when growth begins in the spring, this being done by means of a hand fork, and at this time a good dressing of well decayed manure should be lightly forked in round the roots. The suckers may be replanted for maintaining a succession of bearing plants.

ARTICHOKE (Jerusalem) : The tubers should be planted in a sunny position - the west end of the most westly main plot is a good site—in February and March. They should be 15-in. apart, in rows 3-ft. apart. Draw up the soil round the plants when a foot high and hoe constantly. This crop is ready from November to March and may be dug as required.

ASPARAGUS : An attempt should always be made to cultivate this delicious vegetable. It is easy to grow and is a good cropper ; therefore, the ground cannot be looked upon as put to an extravagant use. When making a new bed—the east end of one of the main plots may be used for the purpose—the site should be thoroughly trenched and liberally manured in March. The plants may be bought in May, or the necessary number secured by sowing the seed in April. When planting Asparagus a ridge should be made with a spade and the plants put astride this ridge, half the roots being spread on each side ; fill in the soil at once and make moderately firm. If seed be sown drills 3-in. deep and from 15-in. to 18-in. asunder should be made and three or four seeds dropped together at intervals of 15-in.—the seeds are fairly large, so this can be done easily—thin the seedlings to one at each station.

Beds made by planting can be cut in two years; from seeds in three years. Each bed can be cut for three or four years; hence a new bed should be made every year. The crop is ready for cutting from April to June, after which time all remaining heads should be left uncut. A scattering of salt should be given to the bed in April and again in May; in spring dress with 3-oz. of superphosphates and 1-oz. of nitrate of soda per square yard; cover with short decayed manure when the heads are cut down in autumn as they should be, removing the roughest of this in the spring.

HORSERADISH: A few plants of this valuable subject should be found in every garden. Plant perfectly straight roots, 4-in. long, either with or without a crown, in December. To plant, make the necessary number of holes 1-ft. deep and 1-ft. asunder, filling with light sandy soil without manure. An odd corner of the garden—the south-east or south-west for preference—should be chosen, since this crop spreads rapidly and remains unattended for many years.

RHUBARB: When making a new Rhubarb bed it is advisable to buy crowns; when an old bed is in existence the crowns should be divided and the separate pieces replanted either in autumn or spring. Rhubarb may be raised from seed, but this is hardly worth while. The site for the Rhubarb bed must be trenched and heavily manured at the rate of five barrow-loads per square rod; the plants should be inserted 3-ft. apart in rows 4-ft. asunder. Forcing may be carried out where the plants are growing, simply by covering them with bottomless boxes with a movable top and surrounding the boxes with fresh stable manure and leaves. A more rapid method, which implies an earlier crop, is to lift some of the roots and set under the greenhouse stage or in some other dark, warm spot, surrounding the roots with old potting soil or leaf mould. The plants which remain in the bed should be given liberal supplies of liquid manure and each fortnight for six weeks a watering with ¾-oz. of sulphate of ammonia and ¾-oz. of sulphate of iron to the gallon of water, after pulling is finished.

SEAKALE : To make a Seakale bed plant three or four seeds 30-in. apart in drills 30-in. asunder in April, thinning later to one plant at each station, or sow in the nursery garden and transplant the following spring. The crop is ready for cutting in February and March, but earlier supplies can be secured by forcing. There are three methods of forcing and if all be adopted a long cropping season is secured. Some of the old plants should be lifted in September as soon as they begin to lose their leaves, planted thickly in good soil in deep boxes or pots, placed in a warm, dark shed and covered with inverted boxes or pots. This will produce the earliest cutting. Some of the plants remaining in the bed should be covered with bottomless boxes with loose lids and surrounded by fresh stable manure and leaves, as suggested for Rhubarb. This affords a second cutting. The remainder of the three-year-old plants—only plants of this age should be forced—should be covered with a heap of clean sand. This will give the third cutting. As the seed pods form in summer they should be cut off.

VEGETABLE MARROW : Seasons are so variable that whenever a frame can be set on one side for growing Marrows this should be done. When grown in the open a hole, 3-ft. square and 1-ft. deep, should be opened for each plant, this being filled with stable manure and firmly trodden down and then covered with a little good soil. Plants may be bought in June, but may be raised at home by sowing the seed in heat in April, removing the seedlings to a cold frame in May, hardening off and planting out in June, one plant to each prepared station. Thin the shoots if becoming too crowded. As soon as a fair number of fruits have set give an occasional watering with weak liquid manure.

THE FRUIT GARDEN

CHAPTER XIV

GARDEN FRUIT TREES

As a general rule, the operator of a small garden cannot accomplish much in the way of growing fruit, since it would hardly prove worth while to devote a considerable area to this crop; hence a few suitable trees on the north boundary wall, and a limited number of bushes, standards and half-standards, or half a dozen or so espaliers, planted in the main vegetable plots is about all that can be managed. In many cases the amateur is strongly advised not to attempt to grow any of the hard fruits—Apples, Pears, Plums— but to concentrate on the soft fruits, such as Loganberries, Raspberries, Currants, Gooseberries, and Strawberries.

If hard fruit is to be grown the best advice that can be tendered regarding a selection is that one should be guided by what is grown successfully in the district by other gardeners. The small gardener has not the necessary time to devote to trying experiments. His time is generally better spent in making a success of more likely subjects.

There is a number of different types of trees available. For training againt a wall the best forms are cordons—with one, two or three stems, or fan-shaped espaliers (Fig. 21). For dotting about the vegetable plots standards, half-standards, pyramids and bushes are preferable (Fig. 22), while espaliers, trained to wires, may be employed along the east and west sides of the plots. When planting, cordons should

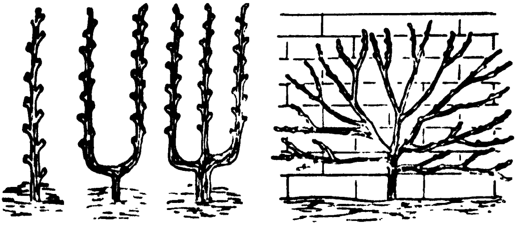

FIG. 21

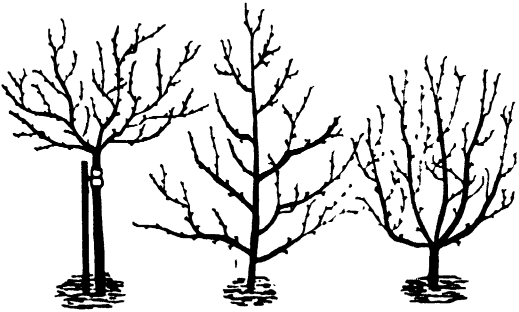

FIG. 22

be 2-ft. to 6-ft. apart; fan-shaped espaliers, 15-ft.; standards, 20-ft.; half-standards, 15-ft.; and bushes and pyramids, 10-ft. apart. If these distances be selected with young trees it will allow ample room for future growth and development.

The following cultural hints concerning the principal hard fruits may prove helpful:

Damsons: These are not recommended for general growing, although they thrive in all parts of the country. They are extremely useful, however, if it be necessary to form a sheltering hedge on the north or east sides of the garden. For this purpose standards and half-standards are employed. During the first few winters the shoots should be shortened about one-third, so as to produce a good head; later nothing need be done in this direction, save to prevent the branches becoming overcrowded. One of the best garden varieties is Merryweather; the fruit is of excellent size and flavour.

Apples: A well-drained soil, of moderate heaviness is the best, but varieties can be obtained that will suit all parts of the country. In the northern counties the best results are obtained when cordons or fan-shaped espaliers are grown against a south wall; in the south the other forms of tree are preferable. If the soil be very heavy or very sandy it should be improved before planting. In the former case lime, mortar rubble, wood ashes and burnt garden refuse should be added; in the latter case, a little heavy loam or even clay should be incorporated with the soil.

Autumn is the best time of the year for planting, but the work may be undertaken during the winter until March, provided the weather be suitable. All newly planted trees should be pruned the first March; the leading branches of the cordons should be slightly shortened, while laterals from spurs already formed should be cut back to two or three buds; the leading shoots of the espaliers should be cut back to 15-in. (Figs. 23, 24, and 25) of the top pair of branches and the leading shoots of the past year's growth half-way, and the laterals should be shortened

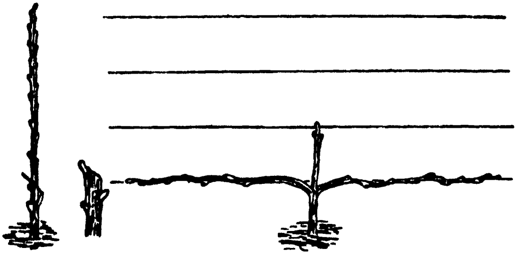

FIG. 23

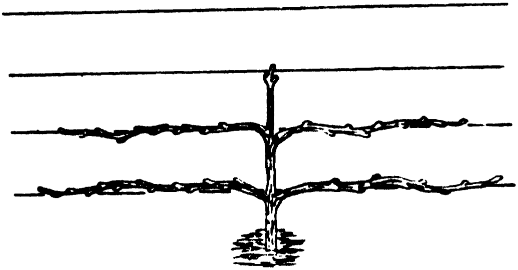

FIG. 24

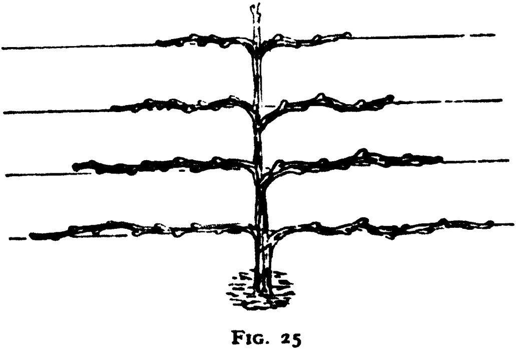

FIG. 25

to two or three buds. Standards, bushes and pyramids should be cut back two-thirds.

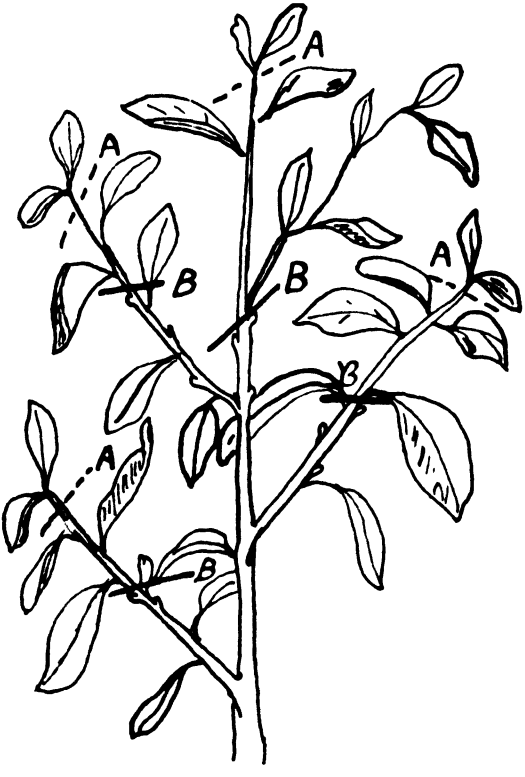

FIG. 26

Established trees should be pruned twice a year, in July and December. In July the side shoots should be shortened to five or six leaves, as this assists the formation of fruit buds. In December the side shoots which were shortened

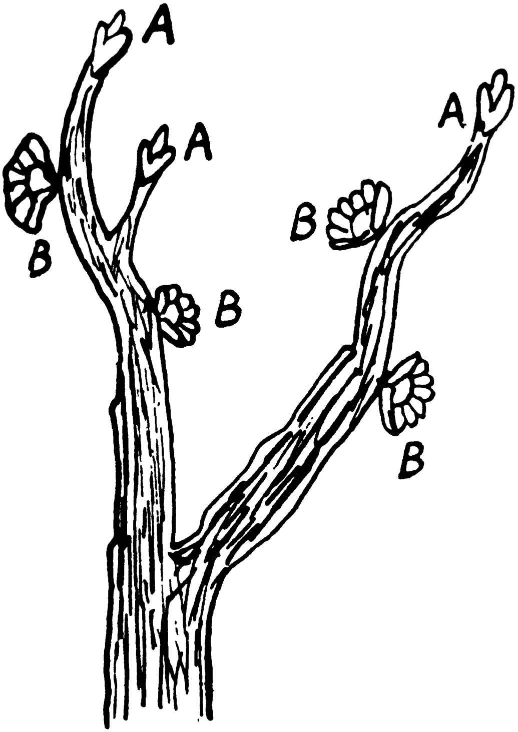

FIG. 27

in summer should be cut back to four buds or to three buds if the tree be not over-vigorous (Figs. 26 and 27). The leading shoots of cordons and espaliers should only be shortened slightly, until they have filled their allotted space; standards and half-standards should only be lightly pruned, but no branches should be left that cross each other; bushes and pyramids should have their leading shoots cut back one-half to two-thirds. In this connexion it should be pointed out that weak trees and bushes should always be pruned more severely than those of strong growth. This applies to all fruit trees alike.

A plan that is seldom adopted by the amateur, but which is productive of excellent results, is to lift all newly planted trees each autumn for the first two or three years, so that any thick roots that have formed may be shortened. Root-pruning is a very necessary duty with young trees and also proves beneficial, say, in the case of old trees which grow well, but crop badly. With old trees it is not necessary nor yet advisable to lift them, but a trench should be dug 4-ft. from the trunk and all thick roots severed.

It is not thought desirable to recommend any varieties of fruit trees, since the kind selected should be one that is known to do well in the district, or if a change be desired the advice of a nurseryman should be sought.

CHERRIES: The growing of this kind of hardy fruit is not advised, but if to be undertaken wall trees should be chosen in preference to other forms. The fruit can more easily be protected from birds, since all that is necessary is to drape netting over them from the top. A light soil, but one that is well-drained, is the best, but some varieties thrive exceedingly well on chalky ground.

It is always necessary to prune wall trees more severely than bushes, pyramids or standards, since they must be restricted to their allotted space. With cordons and fan-shaped trees the side shoots on the branches should be shortened in summer and again in winter, while the main branches may be allowed to increase by about 15-in. a year. If standards and bushes are grown no pruning is necessary the first year; during the second winter the branches should be shortened by one-half; in following winters the shoots should be shortened at the ends of the branches and all thin shoots from the centre removed. With well established trees all that need be done is to remove useless shoots and cut away any that spoil the shape of the tree.

PEARS: This is a very favourite fruit and if hard fruit is to be grown at all an attempt should be made to cultivate this sort. In northern counties the best results are obtained from wall trees, but there is little question that the finest fruit is yielded by trees planted in the open, that is, standards, half-standards, pyramids and bushes. If room can only be found for two or three trees perhaps the amateur will succeed better with pyramids, cordons or espaliers grafted on Quince stock, since these fruit rather earlier than standards and half-standards. Shallow planting is advisable; the roots should not be more than 3-in. below the surface of the soil. The young trees should be lifted for the first two or three years and the thick roots removed; pruning should be carried out as suggested for Apples. October and November are the best months for planting Pears.

PLUMS: Although hardy the Plum does not thrive equally well in all parts of the country, but a suitable variety can generally be secured for the prevailing conditions. Low-lying districts do not produce good fruit in large quantities, as the blossom is so liable to be nipped by late frosts. One of the main requirements of this fruit is an abundance of lime in the soil; if lacking this must be added, while all old, black, rich garden soil is vastly improved by the addition of old mortar rubble and chopped up turf.

Cordons are not suitable for this class of fruit, since they require such severe pruning to keep them in shape; fan-shaped or horizontally trained wall trees are good, but the best results are undoubtedly obtained when standards, half-standards and pyramids are employed. Wall-trained trees should have the leading shoots only slightly shortened until the allotted space has been occupied, but all side shoots should be shortened to seven leaves in July and three buds in winter, so as to encourage the development of fruit spurs. Newly planted standards and pyramids should be cut back so as to produce a good shape, but provided the branches do not overcrowd each other little pruning is necessary with established trees.

Manuring Fruit Trees.

Young trees do not require a rich soil; hence when the station for each is being prepared only a very little manure should be incorporated with the second spit of soil and none with the top spit. If the ground be heavily manured before the trees are planted too vigorous growth will be registered during the first few years and the bearing capacity of the tree will be considerably lowered.

If any trees should appear stunted and make little or no growth a spring application of 1-oz. of a mixture of sulphate of ammonia and nitrate of soda may be given per square yard, but all nitrogenous manures must be used very sparingly. The fruitfulness of all trees, however, is increased by the use of phosphatic manures. A winter application of from 4-oz. to 6-oz. of basic slag will assist enormously in fruit-making, but if the soil be already rich in lime an application of 2-oz. of superphosphates in March will give better results.

With established trees a mulch of old manure lightly forked into the soil in May, with a little liquid manure in the early autumn, constitutes a valuable source of plant food. Duck manure is particularly good for Apple trees and should always be employed when available. Horse, cow and pig manure, in liquid form, may be used for the other fruit trees.

Planting.

October and November are the best months for planting young trees, since this gives time for them to establish themselves before spring arrives. It may, however, be carried out during the winter, if the weather be mild and the soil in a friable condition. The holes should be dug to the necessary depth and the soil improved, as already advised, if necessary, the bottom of the holes being slightly rounded. Before planting any injured roots should be carefully cut away. The trees and bushes should be inserted at the same depth as they were when in the nursery. With standards and half-standards staking is essential; this should be done at planting time, before the hole is filled with soil, so that no damage will be done to the roots (Fig. 28).

Grafting Fruit Trees.

Grafting is very interesting work and there is no reason why the amateur should not succeed in accomplishing the task successfully. One of the chief points to bear in mind is that

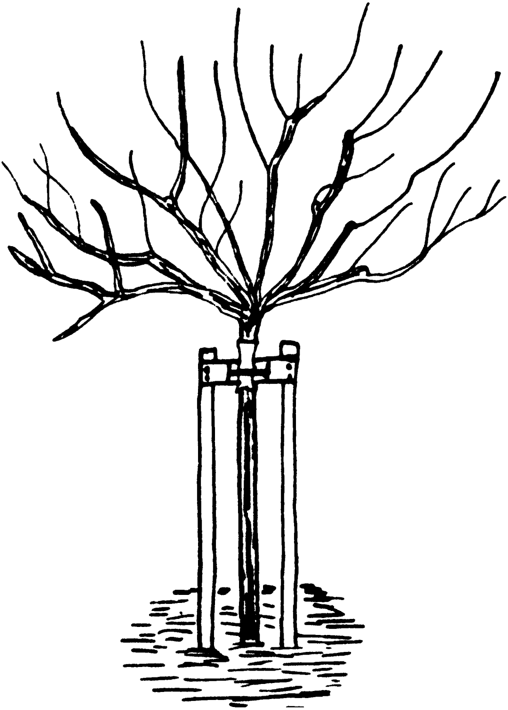

FIG. 28

like should be grafted on like ; that is, a Crab or Paradise stock should be used for Apples, the wild Pear or Quince for Pears ; an inferior species of the same family for Plums. Two

2-in. should be cut off; then selecting smooth places in the bark longitudinal cuts should be made, say, three or four on each stock. The bark should be slightly raised, so that there are two small flaps. The scions are prepared with tongues, obtained by cutting in a slanting direction, and inserted so that the inner wood of the stock and the cut surface of the scion coincide. The whole is bound with raffia and covered with wax or clay.

Budding is frequently done by nurserymen, one bud being inserted in the stem of each stock, in the same way as budding Roses. If the bud remain fresh the shoot grows the following spring; should it fail the top of the stock is taken off about 6-in. from the ground and grafted.

CHAPTER XV

BUSH AND OTHER SOFT FRUITS

ALTHOUGH it may not always be possible to find a site for hard fruit trees, there are few gardens where space cannot be set on one side for the cultivation of some, at any rate, of the soft fruits. No garden, for instance, is complete without its Strawberry bed, but, in addition to this delightful and ever-popular berry, Loganberries, and Raspberries always make a strong appeal to the amateur. Even Blackberries may be pressed into service, as they can be grown to perfection trained against a trellis, say, for covering or hiding some odd corner of the garden. Loganberries are excellent for training over arches, while the east and west sides of the vegetable plots are ideal places for rows of Raspberry canes.

Soft fruits are easy to cultivate and practically always prove eminently satisfactory in every garden. The following cultural hints will assist the amateur to obtain good crops of first-class quality fruit.

BLACKBERRIES: The soil must be deeply dug and enriched with a liberal dressing of decayed manure. The branches should be cut down to ground level the first year, so that a large number of strong shoots will be induced to spring up. Afterwards the old canes should be cut down after fruiting and the new ones trained in their stead. The best variety for garden cultivation is the Parsley-leaved Blackberry.

CURRANTS: These are always welcome, this being specially the case with the black variety. The white and red may be classed in the same group, since they require similar treatment; the black must be dealt with separately, since it needs rather different conditions. A cool, rich, moist soil is most suitable for the black Currant; hence deep digging and liberal manuring before planting are necessary. In the spring the branches of young trees should be cut to 9-in.; established bushes should be pruned in the late summer by removing the old branches, so that the young ones will have ample space to grow (Fig. 30). Established trees benefit by a dressing of 2-oz. of kainit and 5-oz. of basic slag applied in the autumn, or 2-oz. of

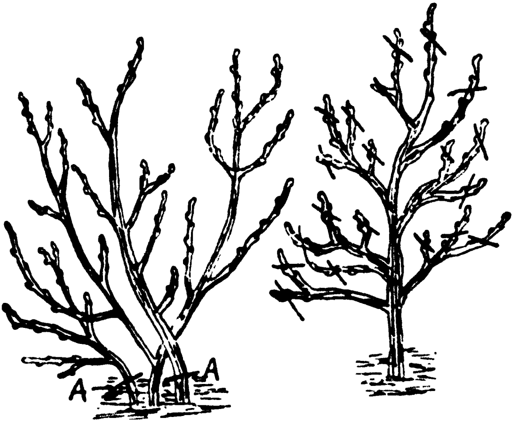

FIG. 30

superphosphates, 2-oz. kainit and 1-oz. sulphate of ammonia applied in late February. These quantities should be given to each tree. Lee's Prolific, Baldwin, September Black and Black Naples are excellent varieties.

Red and White Currant bear their fruit on spurs ; hence after the first year—when they should be treated in the manner suggested for the black variety—all shoots except those at the ends of the branches should be cut back to the sixth leaf in July ; in winter the side shoots should be shortened to the second bud from the base, the shoots at the ends of the branches being cut back one-half (Fig. 30). Red and White Currants should be mulched in the autumn with well decayed manure, this being lightly forked in in May ; if natural manure cannot be obtained a dressing of 5-oz. basic slag and 3-oz. kainit per bush should be applied. A watering with 1-oz. of sulphate of ammonia to the gallon in May should also be given. White Dutch and White Versailles are excellent cropping varieties ; Perfection, Red Grape, Comet and Fay's Prolific are recommended for Red varieties.

GOOSEBERRIES : This is a subject that can be cropped heavily for many years, provided the site be deeply dug and well manured before planting. The branches do not require pruning in the ordinary sense of the word ; all that is necessary being to thin out unwanted branches and shoots. This is best done in February and at this time a mulch of well decayed manure should be given. Failing natural manure a dressing every winter of 4-oz. basic slag, and 2-oz. sulphate of potash per bush is advisable. Gooseberries may be grown as cordon trees ; if this be done they require severe pruning.

The shoots must be shortened to 5-in. in July, while in winter they must be cut back to one or at the most two buds. There is a large number of splendid varieties on the market, some of the best being: Yellow: Early Kent, Gunner, Leveller, Keepsake, Yellow Champagne; Green: Green Hedgehog, Diadem, Telegraph, Rosebery; Red: Lancaster Lad, May Duke, Lord Derby, Red Champagne, Whinham's Industry; White: Langley Gage, Orleans, Whitesmith, Careless, Lancer.

LOGANBERRIES: This subject is a heavy cropper of very luscious fruit and it thrives in practically all parts of the country. It should be treated in the same manner as suggested for Blackberries, being at its best when trained to a trellis, either edging the main vegetable plots or for screening some odd corner of the garden, say, that where the rubbish heap is situated.

RASPBERRIES: This crop thrives excellently in partial shade and may, therefore, be grown against an east wall, but the soil must be deep and moist, unless the crop will prove disappointing. The Raspberry bed should be planted in autumn, the canes being put in 3-ft. apart in rows 5-ft. asunder. The canes may be staked individually, but a better plan is to stretch two stout wires from posts at each end of the rows, training the canes thereto. When planted in the autumn the canes should be cut down to within 8-in. of the ground, so that new ones will be encouraged to spring up. Of these not more than three should be left, the others being cut away as soon as they start to grow freely. In following years all the old canes should be cut away directly the crop has been gathered, leaving from five to seven of the current season's growth, training these to the supports. An application of 10-lb. of basic slag to every 40 square yards of bed in the winter is all the manure necessary, but the canes should be watered throughout the summer, if the weather be dry. Good red varieties for the small garden are Hornet, Pyne's Royal and The Devon; the best yellow variety—a very heavy cropper—is Guinea.

Strawberries.

The Strawberry crop is generally over too quickly, but much can be done to prolong it by planting three different beds. One in a south border will produce fruit as early as June; a second on an east border will provide a second crop; a third bed on a border facing north a late crop. If only one bed can be arranged the best situation for it is on the east border. The ground must be deeply dug and well manured some two or three months before planting.

The bed should be planted during the latter half of September, since the plants must be well established before the bad weather sets in. Rooted plants can be bought at this time, but if there already be a Strawberry bed in existence, new plants can be secured by pegging down the runners into small pots, severing the runner as soon as the new plant has formed roots. Sandy soil should be used for filling the pots, since this is the best rooting medium. After lifting the pots they should be placed in the shade for a few days and then planted out, spacing them 15-in. apart in rows 2-ft. asunder. Plants put out in the autumn will crop abundantly the following year.

The Strawberry beds require careful attention. In late autumn the whole bed should be mulched with old manure, but it must be kept away from the crowns of the plants. In the early spring the mulch should be lightly forked in and at the same time the bed should be covered with short straw to protect the fruit from mud splashes.

When cropping is over all runners, excepting those required for layering, should be removed, together with the oldest leaves. The surface soil should be loosened a little with a fork and an application of soot given. Occasional applications of weak liquid manure during the growing period in spring proves beneficial. If a mulch of natural manure cannot be given in the late autumn a dressing of 1-lb. of sulphate of potash per 40 square yards of bed should be given in the winter.

When looked after in a proper manner a Strawberry should crop well for three years. To ensure a good crop every year, therefore, a new bed should be made each September, the soil after early Peas being particularly good for the purpose. Among the best early varieties are: The Duke, King George V and Royal Sovereign; mid-season varieties, British Queen, President and Veitch's Perfection; late croppers: Dr. Hogg, Givon's Prolific, Sir Joseph Paxton, Waterloo and Latest of All.

Tomatoes in the Open.

Only in well favoured districts is it possible to secure ripe fruit in the open; in most localities it is essential to cultivate this subject under glass. If to be grown in the open the seed should be sown in March under glass with a minimum night temperature of 55 degrees. As soon as two leaves appear the seedlings should be pricked off singly into thumb pots, a good half of the stem being buried in the soil; as they grow they should be moved into larger pots and when about 10 weeks old they should be ready for planting into the open, after judicious hardening off. The best situation for Tomato plants is against a south wall fully exposed to the sun. A medium loam is suitable and good drainage is essential. For the first week or two after planting out the plants should be protected at night by means of drainpipes or very large pots. Weekly waterings with weak liquid manure during the active growing period is desirable, but as soon as the blossom buds form this feeding should cease. Stop the side-shoots by nipping off the tops and remove all those sprays that show little signs of fruit and never allow any plant to grow more than 3-ft. tall. Suitable varieties are Evesham Wonder and Ideal.

Tomatoes under Glass.

To secure a prolonged fruiting period seed should be sown every week throughout February and March. The seed should be sown ¼-in. deep and 1-in. apart in pans or boxes and covered with glass and brown paper and placed close to the glass on high shelves. A sandy loam is the best compost to employ. When two leaves are formed on each seedling prick off into thumb pots and later into larger pots, using at this time a compost consisting of one part turfy loam, one-fifth part half-rotten leaves, a little coarse sand and a 5-in. potful of some special Tomato manure, together with a 9-in. potful of wood ashes and a 5-in. potful of bonemeal to each barrowload of soil. When ten to twelve weeks old they should be ready for their final potting, 10-in. pots being the best for the purpose.

When repotting for the last time the pot should not be filled to the brim with soil, but the plants should be started in a small amount of earth, adding a little fresh compost from time to time as the roots grow. The pots should be placed well up to the light. Another method of growing is to plant out the ten weeks' old seedlings into a bed in the greenhouse, placing the plants 3-ft. apart, training them as they grow to wires about 9-in. from the glass. A similar compost should be used as that suggested for the pot plants.

Whichever method is adopted generous watering throughout the growing season is essential, though, of course, a permanently saturated state is harmful. Over-manuring is injurious and no natural manure should be employed unless it is fully fermented. In place of natural manure a pinch of kainit or nitrate of potash should be given to each plant at intervals during the growing period. All side shoots must be removed, only the flower trusses being allowed to break from the main stem. The plants should have their heads pinched out as soon as they reach the top of the wire when grown in a bed, or when three or four flower trusses have formed. To set the fruit a rabbit's tail should be passed lightly over the flowers each day.

The seed that is sown in February should produce fruit in July; therefore, by sowing a succession of seed fruit may be obtained for two or three months. If winter fruit be wanted further sowings of seed should be made in June and July, the seedlings being treated as already described. Ample ventilation is necessary, but the night temperature should never fall below 55 degrees. For early sowing Orange Sunrise is recommended in the yellow varieties, while Perfection and Chiswick Peach are useful for later sowing. Excellent red varieties are Best of All, Ailsa Craig, The Devon and Laird's Supreme.

CHAPTER XVI

THE GARDENER'S ENEMIES

EVERY effort should be made to detect the presence of disease as soon as possible. All diseases can be controlled quite easily in their early stages; if allowed to run unchecked they quickly become uncontrollable. Preventive measures should be adopted wherever possible, since it is more effective to treat for a likely disease in the winter than to wait until such time as the disease is visible to the eye. For this reason winter spraying is of the greatest value. But it should be remembered that all insects are not injurious. The ladybird, for instance, like the hover-fly, attacks green-fly (aphides), the centipede lives upon soil grubs, while the grub of the ichneumon fly devours other caterpillars. The amateur gardener should take every opportunity, therefore, of learning to distinguish between friends and enemies.

Insect pests may be divided roughly into two classes. Some are sap feeders, boring into the tissue and must be controlled by contact washes or insecticides; others feed on the outer tissue of shoots and leaves so that these may be eradicated by covering their food with a film of poison. When spraying, and this applies to all subjects grown, it is essential to treat both sides of the foliage and all parts of the branches. For sap feeders the spray should be applied with considerable force through a coarse rose; for the biters a fine hose is better, so that the poison is applied in the form of a mist. Fungoid diseases may prove very troublesome, since they develop rapidly. Efforts should be made, therefore, to prevent rather than to cure; early spring spraying with a fungicide is advisable, while all dead wood and bad fruit should be burnt.

Spraying is generally better than dusting with a dry powder, but the latter is frequently employed successfully, especially in cases of mildew. The powders should be dusted over the affected parts in the morning while the leaves are wet with dew and preferably when the day is likely to prove hot. The use of special dusting bellows is recommended.

All fruit trees should have grease bands put on them in September, since the bands prevent insects crawling up the trunks to lay their eggs. Thick brown paper, about 10-in. wide should be bound round the trunk some 4-ft. above the ground and covered with a thick application of cart grease and tar, or special bands may be purchased. The bands should be removed in May, but they should be inspected during the winter and given another coating of grease if necessary.

Soil pests are very common in newly-broken soil and also in garden soil unless it be treated periodically. If such insects be suspected a soil fumigant should be applied in late autumn or early winter, this being dug into the soil at once. There is a number of different fumigants employed, but all of them, excepting naphthalene, must be applied some months before the next crop. With naphthalene, however, it is perfectly safe even for the herbaceous border where the perennials are still in the ground. The following are recommended: Carbide refuse, 30-lb. per square rod; formaline, 2-oz. to the gallon of water, 25 gallons to be applied to each rod; gas lime, 30-lb. per rod; naphthalene, 1½-lb. per rod; and soot, only useful for surface pests, 25-lb. per rod.

When fumigating a greenhouse an evening in calm, fine weather should be chosen, or the morning of a dull, windless day. All ventilators should be closed and broken panes of glass covered, so that none of the fumigant is likely to escape. Two or three successive fumigations are necessary if the house be badly infested. The amateur gardener will find it more satisfactory to purchase one of the special fumigating materials, with the necessary apparatus, than to attempt to employ a makeshift outfit.

Chief Garden Pests.

There is a very large number of pests which the amateur is unlikely to come across; therefore, in the following list only those of more common occurrence are dealt with:

AMERICAN BLIGHT (Woolly Aphis): Sap feeder on most fruit trees; caustic wash in winter and paraffin emulsion in summer, or paint affected parts with methylated spirits, paraffin, quassia wash, tobacco water or carbolic wash.

ANTS: Dig out nests and treat soil with Vaporite; pour boiling water, paraffin, or dilute carbolic acid into nests.

APHIS: Sap feeders on a very large number of flowering plants and vegetables; spray with paraffin emulsion, soap wash or quassia extract; fumigate greenhouse or frame with tobacco; dust with tobacco powder.

ASPARAGUS BEETLE: Cut off and burn all affected heads; paraffin emulsion spray.

BEAN BEETLE: Infested seeds generally float in water; test seeds and do not sow any that float; dip Beans and Peas into boiling water for five seconds; dust leaves with lime or soot.

BELL MOTH: A leaf-roller on Roses, Lilac and many other flower heads; crush leaves to kill grubs; burn all affected shoots; tobacco water or soap wash spray.

BLACK FLY: This is particularly harmful to Broad Beans; pinch out and burn tops; dust with tobacco or hellebore powder; tobacco water or soap wash spray.

BULB MITE: No infested bulbs should be planted; soak all bulbs in quassia extract or 1-oz. potassium sulphide to the gallon of water.

CABBAGE MOTH: The caterpillars feed at the heart of the plant; hand-pick caterpillars; deep digging in winter to destroy pupæ.

CABBAGE ROOT FLY: Burn all affected plants; do not grow plants of the same family for two years on the same ground.

CARNATION FLY: Maggot feeds inside the stem; pinch out affected shoots; burn all withered plants; tobacco spray.

CARROT MOTH: Caterpillars spin up leaves; pick off spun leaves and burn; pyrethrum spray.

CELERY FLY: Caterpillars tunnel leaves; pinch out affected parts and crush to kill grubs; soap wash in June and July; burn all refuse from the crop; use fresh ground for next two years.

CODLIN MOTH: Grubs feed inside fruit, principally Apples, but also on other fruits at times; burn affected fruit; caustic wash or paraffin emulsion; grease-banding.

CUCKOO-SPIT (Froghopper): Grubs feed in froth; brush off and destroy insects; wash off froth with soapy water and stiff brush; paraffin emulsion.

CURRANT MOTH: Larvæ eat into fruit and then bore into shoots; soda emulsion spray in winter; burn infested shoots; hand-pick.

DART MOTH: Caterpillars feed in autumn and spring on numerous subjects, chiefly Sunflowers; fork round plants to destroy caterpillars in the soil; water with warm soft soap solution as the caterpillars emerge from the ground; destroy chrysalides by deep digging in winter.

EARWIGS: Very injurious to Dahlias and many other plants; deep digging in winter to destroy grubs; trap with inverted pots filled with hay or moss on top of stakes.

EEL WORM: Bores into the tissue of the plants; remove and burn affected plants.

FIGURE OF EIGHT MOTH: Attacks Pears, Plums and Cherries; eggs laid on shoots in September; burn dead leaves and twiggy rubbish containing cocoons.

FRUIT BARK BEETLE: Eggs laid in bark in May, beetles appear in the autumn; caustic soda spray; burn rubbish and prunings.

GALL MITES: Burn affected shoots; hard pruning; dress cuts with knotting; dilute paraffin emulsion spray in winter.

GOOSEBERRY SAWFLY: Shake bushes and destroy caterpillars; quassia or paraffin emulsion spray; dust with lime or soot in wet weather; remove top soil in winter and destroy grubs.

LACKEY MOTH: A tent caterpillar; scrape off " bracelets " of eggs in winter; burn refuse and litter.

LEAF MINERS: There is a number of Miners which cause blisters on Holly, Laburnum, Lilac and other leaves; gather and burn all affected shoots and damaged blooms.

LEATHER JACKETS (Grubs of Daddy Long Legs): Keep ground well forked; trap with pieces of Potato or Carrot; dress ground with lime.

MAGPIE MOTH: The yellow and black larvæ are conspicuous on every Raspberry, Currant and Gooseberry bush; search for eggs; hand-picking; burn litter in autumn.

MILDEW: At the first sign of grey patches or spots forming on the leaves or shoots dust with flowers of sulphur or use a sulphur wash.

MILLIPEDES: Keep soil well worked; destroy when seen.

ONION FLY: Burn all affected plants; weak paraffin wash in summer; sprinkle gas lime or powdered charcoal between the rows; earth up to the neck.

PEA BEETLE: See Bean Beetle.

PUG MOTH: Caterpillars eat both leaves and flowers of various plants; shake off caterpillars into brine solution or paraffin at night.

RED SPIDER: Generally attacks plants that are insufficiently watered; spray with 1-oz. potassium sulphide to three gallons of water.

ROSE RUST: Burn diseased leaves and fallen leaves; spring spray of 1-oz. potassium sulphide in three gallons of water; sponge parts with methylated spirits and water, using a 50-50 solution.

SCALE: In appearance this is like small mussel shells on the bark of fruit trees; caustic or paraffin and soap spray.

SILVER LEAF: The Silver Leaf Order states that all dead wood from Plum and Apple trees must be cut off and burnt before July 15th.

soaked in paraffin round choice plants; use traps of bran, ½-in. deep and covered with a *cabbage leaf, near the plants, burning all slugs in the morning; good cultivation and efficient* drainage are the best preventive measures to adopt.

Snowy Fly: Sap feeder on Cabbages, Tomatoes and other garden plants; quassia or tobacco wash; fumigate under glass.

Spectacle Moth: Caterpillars feed in autumn, especially on Dahlias; night-hunting for the caterpillars; Hellebore spray.

Thrips: Sap feeders on Sweet Peas, Chrysanthemums, bush fruit and many other subjects; quassia or paraffin emulsion spray.

Turnip Beetle: Deep digging; war on weeds; soil fumigation.

Vapourer Moth: Affect Apple trees chiefly, but also found on other fruit trees; hand-pick eggs and cocoons in winter; hand-pick caterpillars as they appear; spray with 2-oz. Paris Green to 25 gallons of water; arsenate of lead wash.

Wart Disease: Potatoes affected by Wart Disease must be reported immediately to an Inspector under the Ministry of Agriculture.

Winter Moth: Affect Apples and other fruit trees; grease-banding; paraffin emulsion spray in spring.

Wireworms: See Leather Jackets.

Wood Leopard Moth: Woodboring larvæ make galleries in trunk of Apple and other trees; remove moths from trunks in May; syringe tunnels with brine.

Woodlice: Keep greenhouse and shed walls

ARSENATE OF LEAD: 1-oz. arsenate of soda, 2½-oz. sugar of lead, 14 gallons rain water; then add 1½-lb. black treacle.

BURGUNDY MIXTURE: Dissolve 4-lb. copper sulphate in 29 gallons of water and 5-lb. of washing soda in 18 gallons of water; mix the two solutions, then add 1¼-lb. soft soap dissolved in 2 gallons of water.

CARBOLIC WASH: 4-oz. carbolic soft soap, ¼-pint petroleum, and 1 gallon of water.

CAUSTIC WASH: 2-lb. caustic soda dissolved in 10 gallons of water.

LAWN SAND: 24-lb. sand, 4-lb. sulphate of ammonia, 1½-lb. sulphate of iron.

LIME WASH: 2-lb. fresh lime, 1 gallon of water.

LIME WATER: 1-lb. lime, 2 gallons of water.

NICOTINE WASH: 1½-oz. nicotine extract, 2-lb. soft soap, 20 gallons of water.

PARAFFIN EMULSION: 2 gallons paraffin, 6-lb. caustic soda, 1½-lb. soft soap, 28 gallons of water; dissolve soap in one gallon of boiling water, stir in the paraffin, then dissolve soda in 27 gallons of water and mix the two solutions just before using.

PARAFFIN WASH: ½-lb. soft soap, 2½ pints paraffin, and 10 gallons of water.

PYRETHRUM EMULSION: Dissolve 1-lb. pyrethrum powder and ½-lb. soft soap in a little hot water, leave for 4 hours, then dilute to 5 gallons with water and stir thoroughly.

QUASSIA EXTRACT: Boil 4-oz. quassia chips for 10 minutes in one gallon of soft water; strain and stir in 4-oz. soft soap.

Soda Emulsion: Dissolve ½-lb. sulphate of iron in 9 gallons of water, slake ½-lb. lime with a little water and then bring to the consistency of milk; add the first solution to the second and strain; stir in 5 pints of paraffin; immediately before use add 2-lb. caustic soda powder.

Soap Wash: 1-lb. soft soap, and 4 gallons of soft water.

Sulphur Wash: 3-lb. flowers of sulphur, 6-lb. quicklime, 1-lb. caustic soda and 10 gallons of water.

Tobacco Water: 2-lb. soft soap, 3 gallons soft water, 1 quart tobacco liquid added when cold.

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